

HANDBOOK
TO
DR. KOCH'S TREATMENT
IN
TUBERCULAR DISEASE.

GRÜN AND SEVERN.

M18352

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GRUN, Edward Ferdinand and
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The following cases and temperatures were received from Berlin too late for publication, but are inserted in this form because of the interest attaching to them.

Temperatures of Weigt continued to November 27.

Date.	Time.	Temperature.	Remarks.
*November 20	7 a.m.	98·0	T.B., 2. Injection 0·1 at 12 mid-day.
	10 a.m.	99·0	
	1 p.m.	99·5	
	4 p.m.	99·8	
	7 p.m.	99·3	
November 21 -	7 a.m.	98·0	T.B., 0. 125 $\frac{3}{4}$.
	10 a.m.	98·6	
	1 p.m.	98·6	
	4 p.m.	99·7	
	7 p.m.	99·2	
November 22 -	7 a.m.	97·7	T.B., 4-5.
	10 a.m.	98·6	
	1 p.m.	99·2	
	4 p.m.	98·6	
	7 p.m.	98·8	
November 23 -	7 a.m.	97·5	
	10 a.m.	98·2	
	1 p.m.	98·6	
	4 p.m.	99·2	
	7 p.m.	99·5	
November 24 -	7 a.m.	98·6	T.B., 0.
	10 a.m.	98·6	
	1 p.m.	99·2	
	4 p.m.	98·4	
	7 p.m.	98·6	
November 25 -	7 a.m.	99·8	T.B., 2-3.
	10 a.m.	99·5	
	1 p.m.	98·2	
	4 p.m.	97·7	
	7 p.m.	98·0	

* From this date onwards, no further injections.

Date.	Time	Temperature.	Remarks.
November 26 -	7 a.m.	97·8	T.B., 4-5.
	10 a.m.	98·2	
	1 p.m.	98·4	
	4 p.m.	97·4	
	7 p.m.	97·7	
November 27 -	7 a.m.	98·0	
	10 a.m.	98·4	
	1 p.m.	98·8	
	4 p.m.	99·0	
	7 p.m.	98·0	

The following is an additional case of great interest which came to hand too late for insertion in proper class.

Nitschke, shoemaker, aged 20, under care of Drs. Frantzel and Růnkwitz.

Before treatment, hæmoptysis, cough, and expectoration; innumerable bacilli in sputum; right supraclavicular dulness. Dulness on left side down to second rib; crepitations on both sides; weight on admission, $97\frac{1}{2}$ lbs.; after 53 days' treatment, diminution of dulness on right side; complete disappearance of dulness on left side; entire absence of crepitations on right side; on left side crepitations still present, cough only at night and early morning; expectoration diminished, tubercle bacilli absent; weight $104\frac{1}{4}$ lbs., gain of $6\frac{3}{4}$ lbs.

Date.	Time.	Temperature.	Remarks.
October 6 -	7 a.m.	99·2	
	10 a.m.	99·0	
	1 p.m.	98·6	
	4 p.m.	98·0	
	7 p.m.	98·4	

Date.	Time.	Temperature.	Remarks.
October 7	- 7 a.m.	98·8	The injection is always made at 9 a.m.
	10 a.m.	98·8	
	1 p.m.	99·0	
	4 p.m.	98·8	
	7 p.m.	98·6	
October 8	- 7 a.m.	98·2	
	10 a.m.	98·4	
	1 p.m.	98·8	
	4 p.m.	99·0	
	7 p.m.	101·0	
October 9	- 7 a.m.	97·7	·001.
	10 a.m.	97·8	
	1 p.m.	98·6	
	4 p.m.	101·6	
	7 p.m.	103·3	
October 10	- 7 a.m.	100·2	
	10 a.m.	98·4	
	1 p.m.	98·2	
	4 p.m.	98·8	
	7 p.m.	99·4	
October 11	- 7 a.m.	98·2	·002.
	10 a.m.	99·8	
	1 p.m.	100·6	
	4 p.m.	101·3	
	7 p.m.	101·4	
October 12	- 7 a.m.	98·0	·003.
	10 a.m.	98·2	
	1 p.m.	99·4	
	4 p.m.	104·0	
	7 p.m.	104·6	
October 13	- 7 a.m.	98·0	97½.
	10 a.m.	98·4	
	1 p.m.	98·5	
	4 p.m.	99·4	
	7 p.m.	98·8	
October 14	- 7 a.m.	99·4	·004.
	10 a.m.	99·4	
	1 p.m.	99·5	
	4 p.m.	103·8	
	7 p.m.	102·8	

Date.	Time.	Temperature.	Remarks.
October 15	- 7 a.m.	99·8	·005.
	10 a.m.	99·4	
	1 p.m.	98·8	
	4 p.m.	99·5	
	7 p.m.	101·4	
October 16	- 7 a.m.	99·5	·007.
	10 a.m.	98·8	
	1 p.m.	100·8	
	4 p.m.	101·3	
	7 p.m.	102·7	
October 17	- 7 a.m.	99·7	·008.
	10 a.m.	99·8	
	1 p.m.	101·2	
	4 p.m.	103·1	
	7 p.m.	102·8	
October 18	- 7 a.m.	98·2	T.B., 7·8.
	10 a.m.	99·8	
	1 p.m.	100·0	
	4 p.m.	99·4	
	7 p.m.	97·8	
October 19	- 7 a.m.	98·2	T.B., 6. Secondary reaction.
	10 a.m.	99·4	
	1 p.m.	100·0	
	4 p.m.	100·4	
	7 p.m.	99·7	
October 20	- 7 a.m.	98·0	·008.
	10 a.m.	100·0	
	1 p.m.	99·5	
	4 p.m.	99·8	
	7 p.m.	102·4	
October 21	- 7 a.m.	97·7	0·01.
	10 a.m.	99·2	
	1 p.m.	98·8	
	4 p.m.	99·8	
	7 p.m.	99·7	
October 22	- 7 a.m.	99·0	0·01 injection.
	10 a.m.	100·2	
	1 p.m.	100·0	
	4 p.m.	99·4	
	7 p.m.	99·2	

Date.	Time.	Temperature.	Remarks.
October 23	7 a.m.	99·0	T.B., 1·2.
	10 a.m.	100·2	
	1 p.m.	99·2	
	4 p.m.	101·3	
	7 p.m.	98·0	
October 24	7 a.m.	98·6	T.B., 0.
	10 a.m.	98·8	
	1 p.m.	99·4	
	4 p.m.	98·8	
	7 p.m.	98·6	
October 25	7 a.m.	99·4	T.B., 0.
	10 a.m.	99·5	
	1 p.m.	98·8	
	4 p.m.	98·4	
	7 p.m.	98·8	
October 26	7 a.m.	99·5	T.B., 4.
	10 a.m.	101·3	
	1 p.m.	101·4	
	4 p.m.	100·2	
	7 p.m.	100·0	
October 27	7 a.m.	100·4	0·05. T.B., 5.
	10 a.m.	101·8	
	1 p.m.	102·4	
	4 p.m.	103·1	
	7 p.m.	102·4	
October 28	7 a.m.	99·2	This case brings out the secondary reaction very well. T.B., 4.
	10 a.m.	100·8	
	1 p.m.	100·4	
	4 p.m.	99·7	
	7 p.m.	99·5	
October 29	7 a.m.	99·4	0·05. T.B., 4.
	10 a.m.	101·2	
	1 p.m.	100·4	
	4 p.m.	100·4	
	7 p.m.	101·4	
October 30	7 a.m.	99·8	Secondary reaction. T.B., 4·5.
	10 a.m.	100·4	
	1 p.m.	100·2	
	4 p.m.	99·2	
	7 p.m.	99·7	

Date.	Time.	Temperature.	Remarks.
October 31 -	7 a.m.	99.2	
	10 a.m.	101.6	
	1 p.m.	99.4	T.B., 0.
	4 p.m.	99.2	Wt., 99.
	7 p.m.	98.6	
November 1 -	7 a.m.	97.8	0.06.
	10 a.m.	100.4	T.B., 2.
	1 p.m.	99.8	
	4 p.m.	99.7	
	7 p.m.	100.4	
November 2 -	7 a.m.	99.8	
	10 a.m.	100.2	
	1 p.m.	99.7	T.B., 5.
	4 p.m.	99.7	
	7 p.m.	98.6	
November 3 -	7 a.m.	98.6	Secondary reaction.
	10 a.m.	101.3	
	1 p.m.	100.4	T.B., 3.
	4 p.m.	99.7	
	7 p.m.	98.8	
November 4 -	7 a.m.	99.2	0.06.
	10 a.m.	99.7	T.B., 3.
	1 p.m.	99.4	
	4 p.m.	99.4	
	7 p.m.	100.8	
November 5 -	7 a.m.	99.0	
	10 a.m.	101.4	T.B., 3.
	1 p.m.	100.4	Secondary reaction.
	4 p.m.	98.8	
	7 p.m.	98.6	
November 6 -	7 a.m.	99.0	
	10 a.m.	101.3	T.B., 2.
	1 p.m.	99.5	
	4 p.m.	98.6	
	7 p.m.	99.7	
November 7 -	7 a.m.	98.2	
	10 a.m.	99.4	T.B., 2.
	1 p.m.	99.4	Wt., 99 $\frac{3}{4}$.
	4 p.m.	98.4	
	7 p.m.	98.4	

Date.	Time.	Temperature.	Remarks.
November 8 -	7 a.m.	98·6	0·07. T.B., 0.
	10 a.m.	101·0	
	1 p.m.	100·6	
	4 p.m.	101·2	
	7 p.m.	100·4	
November 9 -	7 a.m.	99·4	T.B., 1·2.
	10 a.m.	99·8	
	1 p.m.	100·4	
	4 p.m.	99·4	
	7 p.m.	99·2	
November 10 -	7 a.m.	98·8	T.B., 0.
	10 a.m.	99·5	
	1 p.m.	98·6	
	4 p.m.	99·2	
	7 p.m.	98·8	
November 11 -	7 a.m.	98·8	T.B., 2.
	10 a.m.	100·0	
	1 p.m.	99·5	
	4 p.m.	99·2	
	7 p.m.	99·2	
November 12 -	7 a.m.	99·7	0·08 injection. T.B., 1.
	10 a.m.	100·2	
	1 p.m.	100·2	
	4 p.m.	100·2	
	7 p.m.	100·2	
November 13 -	7 a.m.	100·2	T.B., 1·2.
	10 a.m.	101·3	
	1 p.m.	98·6	
	4 p.m.	100·0	
	7 p.m.	103·1	
November 14 -	7 a.m.	98·6	T.B., 1. Wt. $104\frac{1}{2}$.
	10 a.m.	99·7	
	1 p.m.	99·7	
	4 p.m.	99·5	
	7 p.m.	99·2	
November 15 -	7 a.m.	99·7	·01 injection. T.B., 3·4.
	10 a.m.	100·2	
	1 p.m.	101·3	
	4 p.m.	101·2	
	1 p.m.	99·8	

Date.	Time.	Temperature.	Remarks.
November 16 -	7 a.m.	99.2	T.B., 3.4.
	10 a.m.	99.8	
	1 p.m.	99.2	
	4 p.m.	99.4	
	7 p.m.	98.6	
November 17 -	7 a.m.	99.0	
	10 a.m.	101.0	
	1 p.m.	101.2	
	4 p.m.	99.5	
	7 p.m.	99.2	
November 18 -	7 a.m.	98.6	0.05 injection. T.B., 2.
	10 a.m.	100.4	
	1 p.m.	98.8	
	4 p.m.	99.5	
	7 p.m.	98.6	
November 19 -	7 a.m.	99.2	0.01. T.B., 1.2.
	10 a.m.	99.5	
	1 p.m.	99.8	
	4 p.m.	99.8	
	7 p.m.	99.4	
November 20 -	7 a.m.	99.0	0.05 injection. T.B., 1.
	10 a.m.	100.0	
	1 p.m.	100.2	
	4 p.m.	100.2	
	7 p.m.	100.8	
November 21 -	7 a.m.	98.0	T.B., 1. 104 $\frac{1}{4}$ lbs.
	10 a.m.	100.6	
	1 p.m.	99.8	
	4 p.m.	99.5	
	7 p.m.	98.2	
November 22 -	7 a.m.	98.6	
	10 a.m.	99.2	
	1 p.m.	99.2	
	4 p.m.	97.8	
	7 p.m.	98.0	
November 23 -	7 a.m.	98.6	0.1 injection. T.B., 1.2.
	10 a.m.	100.4	
	1 p.m.	100.4	
	4 p.m.	100.2	
	7 p.m.	101.3	

Date.	Time.	Temperature.	Remarks.
November 24 -	7 a.m.	99·4	} Secondary reaction.
	10 a.m.	99·5	
	1 p.m.	100·4	
	4 p.m.	100·8	
	7 p.m.	99·5	
November 25 -	7 a.m.	98·6	T.B., 1.
	10 a.m.	99·0	
	1 p.m.	99·0	
	4 p.m.	99·4	
	7 p.m.	99·0	
November 26 -	7 a.m.	97·8	0·1 injection. T.B., 2·3.
	10 a.m.	98·2	
	1 p.m.	99·0	
	4 p.m.	99·4	
	7 p.m.	99·5	
November 27 -	7 a.m.	98·2	
	10 a.m.	98·6	
	1 p.m.	99·5	
	4 p.m.	100·0	
	7 p.m.	99·5	



Sir Joseph Lister Bart.

In the Authors Compliments

BACILLUS TUBERCULOSIS.

Showing effect of the Injection on the Microscopical Appearance
of the Bacillus.

Fig. 1.



Tubercular Sputum. Before the injections.

Fig. 2.



After injections.

* NOTE. —The degenerated bacilli are more difficult to stain than healthy bacilli.

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HANDBOOK

TO

DR. KOCH'S TREATMENT

IN

TUBERCULAR DISEASE.

By EDWARD F. GRÜN, M.R.C.S., L.R.C.P., and
WALTER D. SEVERN, Assoc. Roy. Coll. Sci.



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Introduction.

Many attempts have been made from time to time to combat that most wide-spread of all diseases, Tuberculosis, in its different forms of lupus, chronic and acute affections of the bones, joints, &c., and especially that most obstinate and deadly foe to humanity, consumption, or tubercular disease of the lungs. Each fresh attempt has, after being heralded with a great flourish of trumpets, been found worthless, or nearly so. It is therefore only natural that the announcement of Professor Koch's marvellous discovery in Berlin should have been received with a considerable amount of incredulity. We are publishing this little book in the hope that it may avail in clearing up any doubts in the lay or even professional mind as to the efficacy of the treatment; and also that it may serve as a practical handbook for physicians in the actual administration of the remedy, when it chances, as we have reason to believe it may, to come into the hands of every careful practitioner. We say this the more readily as the whole system of injection for tuberculosis, as it is being practised at Berlin, is so simple in technique, that with attention to certain details, hereafter to be given, as soon as sufficient lymph comes to hand, the carrying out of the same will be possible to every naturally capable medical man. It is with the desire of making the system in its details apparent to the conception of such men that this book is published, and we believe its publication to be neither premature nor unnecessary, as the literature on this subject is at present scattered over various journals, and one pamphlet, these having aroused both lay and professional

curiosity to the highest pitch. The observations are the result of personal investigation on the spot, chiefly at the Charité Hospital, Berlin, where, owing to the kindness of Drs. Fränkel and Runkwitz, the various items of information were collected. We will now pass on to a short resumé of procedure adopted by Koch and other systematic workers in the investigation of bacillus tuberculosis, as a prelude to describing the treatment itself.

Point House,
Putney.

9, Earl's Court Square,
South Kensington,
Nov. 29th, 1890.



H A N D B O O K
TO
DR. KOCH'S T R E A T M E N T
IN
T U B E R C U L A R D I S E A S E.

By EDWARD F. GRÜN, M.R.C.S., L.R.C.P., and
WALTER D. SEVERN, Assoc. Roy. Coll. Sci.



PART I.

THE BACILLUS TUBERCULOSIS.

The specific organism which has been discovered by Koch, and so ably and conclusively proved by him to be the actual cause of Tuberculosis, presents itself in small, thin, rod-like forms, and multiplies by means of spores; it therefore belongs to that division of bacteria called bacillus (*Lat.*: baculus, a little rod). These rods are sometimes bent and sometimes straight, and vary considerably in length and thickness.* This organism is one of those which are so minute that it is practically impossible to see it unless it is brought into contrast with surroundings of debris, tissue, or cell nuclei, by means of staining with aniline dyes, and leaving the background unstained, or *vice versa*. This property (so invaluable to the bacteriologist) of the protoplasmic substance of bacteria being capable of absorbing such brilliant colouring matter as aniline dyes was that which first led Koch to his discovery of the tubercle bacillus. We now are possessed of a very certain way of distinguishing the tubercle bacilli in sputum, &c. from

* For proper examination of the bacillus, an object glass of at least $\frac{1}{12}$ " must be used; many object glasses described as $\frac{1}{12}$ " are very far from being of this power, but the $\frac{1}{12}$ " of Zeiss may be depended upon.

other organisms by the fact that, after staining the whole debris and bacilli together with Fuchsin (magenta), on immersing in dilute nitric acid, the colour is abstracted from the surrounding substances, leaving the tubercle bacilli standing out as red rods on a colourless or very pale ground.

The technique to be observed is the following : Dissolve 10 grains Fuchsin in two drachms rectified spirit by application of gentle warmth over spirit lamp (Rosaniline Hydrochloride), and then shake up 30 drops of aniline (aniline oil) with one drachm of distilled water in a test tube, filter the emulsion, and pour the filtrate into a watch glass ; add five drops of the solution of Fuchsin to the aniline water in the watch glass, and this mixture is the stain to be used. Take the specimen of sputum to be observed, and pick out with a needle one of the little caseous* yellow masses, smear this on a thin cover glass, dab another cover glass on the top, press, and draw them apart, so as to get two cover glasses with a thin film of cheesy matter on each. Let them dry. Next take each† and pass it quickly three times through a Bunsen burner or spirit lamp flame. Warm the Fuchsin stain in the watch glass, and place the cover glasses face down successively for‡ *about 15 minutes* in the stain. Dip the cover glass in nitric acid (dil. B.P.)§ for one minute, and wash thoroughly with distilled water. The background of debris, and other organisms may now be stained blue for contrast by immersing the cover glass for five minutes in an alcoholic solution of methylene blue diluted with water. Dip the cover glass in water to remove the superfluous stain. Pass it then through alcohol, and leave it to dry with edge on blotting paper. This cover glass preparation may be mounted in Canada balsam. There are many rapid stains, such as that of Dr. Henneage Gibbe, but they must be sought for in the treatises of their respective authors.

* If there be no caseous material in sputum, bacillus is much more difficult to find.

† Separately.

‡ Not less than 15 minutes, preferably 30 minutes.

§ If the nitric acid be too strong, it may take the stain out of the bacillus.

The method of staining adopted at the Charité is as follows :—

Prepare cover glasses as before. After passing three times through Bunsen flame to coagulate albumen, proceed thus :—

Make three solutions, A, B, and C, two drachms of each—

A. Fuchsin 1, alcohol 10, phenol 5, water 100.

B. Nitric acid 1, distilled water 3.

C. Methylene blue 1, water to saturation.

Immerse cover glass in the stain for five minutes. Remove cover glass from A with a pair of forceps, dip it into solution B for one minute, wash in distilled water, then dip into solution C for five minutes, both A and C should be gently warmed, pass through alcohol for about one minute or wash in water, and examine for bacilli.*

In making a “pure”† cultivation of the tubercle bacillus, much greater attention to details, much greater care has to be observed, and a considerably longer time has to be expended than in the case of most other organisms. The organism can only be cultivated to any extent on blood serum. The serum is introduced into sterilized, plugged tubes, sterilized by a very long method extending over a week,‡ solidified and then inoculated with a platinum needle previously heated to redness and allowed to cool. The tubercular substance used for the inoculation must be taken from the very centre of a tubercular nodule, after first cutting off all the outside quickly with clean hot scalpels. About 10 or 12 tubes should be inoculated in each case, and left in the incubator at temperature of 35°—37·5° C.§ After about 10 days’ to 2 weeks’ incubation, one sees signs of multiplication of the bacilli, and after a time the small separate colonies which have at first appeared, unite, and finally the whole inoculated portion of the previously shining flat surface of serum

* To fix cover glass on slide, Canada Balsam dissolved in Xylol is the best vehicle.

† That is a culture quite free from extraneous organisms.

‡ Koch’s method of discontinued sterilization.

§ Or 95°—99·5° F.

appears covered with yellowish grey, hard, dull scales, consisting of millions of bacilli packed close together. Other so-called "generations" of bacilli may be cultivated from these, by inoculating fresh tubes of blood serum with small particles of the old cultures, and this may be done so often that we may rest assured that no extraneous substances remain from the original tubercular material inoculated into the first tube.

A small fragment of any of these cultures introduced into a little pocket in the sub-cutaneous tissue of a rabbit, or guinea pig, renders the part, after a short time, tubercular. An abscess appears, the surrounding tissues break down, and caseate, and finally, after from four to seven weeks, general tubercular symptoms set in, and the animal dies. The tubercle bacillus may be found distributed throughout the organs at the autopsy, the lungs being covered with small and large greyish tubercles, and sections may be cut, and further inoculations made.

In the above very curtailed description of Koeh's laborious years of research are contained his postulates, or conditions of proof to be fulfilled before we can certainly say that any particular organism is the actual *causa causans* of any specific disease.

These postulates he laid down as follows:—

- (1.) The organism must be found in any animal dead or suffering from the disease in question.
- (2.) From this animal the organism must be cultivated through successive generations on nutrient media outside the animal body.
- (3.) The cultivated organism must, after going through several culture series or "generations," again produce the disease in question, with its characteristic symptoms, on inoculating it into healthy animals.
- (4.) In these experimental animals, either before or after death, the organism must again be found, and fresh cultures established.

Unless the above postulates have been fairly carried through, it is impossible to state definitely and authoritatively, that any given parasite is the cause of a disease. But if they are carried out accurately, they are amply sufficient

proof of a very scientific kind, and they have been carried out in numberless experiments all over the world since Koch's first work on the subject, by various conscientious workers.

PART II.

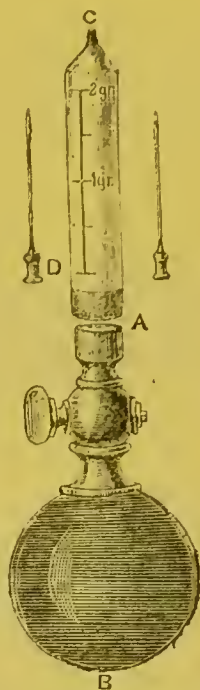
THE "LYMPH," OR ACTUAL FLUID INJECTED.

The lymph as it issues from Professor Koch's laboratory at the Hygienic Institute in Berlin, is a clear, tolerably mobile, straw-coloured liquid, almost inodorous, and with a slightly saline taste, and is not, as many conjecture it to be, an "attenuated" culture of bacillus tuberculosis; in fact, the principle of Dr. Koch's method of cure is not that which was first used by Pasteur in the case of anthrax, and does not depend upon the principle of "mitigation of the virus," being perhaps more allied to what might be called *nachimpfung*, or overtaking treatment, because the injection produces a subsequent benign pathogenic condition. But the fluid itself, not containing the organisms, it is no case of acclimatisation of the system, as is the theory of the inoculation of hydrophobia virus in an attenuated or mitigated state, but if we may be allowed to guess, we would suggest that this treatment depends for its principle on the fact that the bacillus, like others, is killed by an excess of its own poisonous excreta.

The active principal contained in the lymph is so excessively powerful in its action that the actual maximum strength of lymph as at first obtained would be far too strong to use; the strongest solution which is actually used in the injections, even in the most extreme cases, is this "original" lymph, diluted 10 times (10 per cent.).* And the maximum quantity injected in one place is one cubic centimetre. The injections are made, not with the ordinary

* Diluted with distilled water, to which has been added 1 per cent. phenol.

hypodermic syringe of Pravaz, but with a modification of this invented by Koch, and used by him all through his bacteriological work. The essential difference between the two, is that for the piston in the ordinary syringe, which would be very difficult to effectually sterilize, is substituted a ball of india-rubber, to which the glass portion is connected loosely, but air-tight by being ground in at A, while at the other end of the ball is an aperture, B, to be covered while in use by the finger, so that air may be admitted as needed. At C, the needle is fixed, and the instrument holds to the tenth graduation at zero, D, exactly 2 c.c., each division being 0.5 cc. To sterilize the syringe, it suffices to rinse the glass part first with mercuric chloride solution 1 in 2,000, and then thoroughly with absolute alcohol.



When the lymph is once diluted, its keeping properties are considerably diminished. Not only is it more subjected to chemical change—presumably of the ptomaine in solution undergoing decomposition, or re-arrangement of the atoms in the molecule—but also it is nearly sure during previous operations to have derived bacterial impurities from the atmosphere or surrounding objects, so that before use each time the solution should be heated up to kill any spores of bacteria which may have sprouted in the intervening time.

But after a certain number of times of heating up, it is observed that the effect of the lymph goes off considerably, owing probably to chemical decomposition or change which goes on, promoted by the repeatedly raised temperature, so that freshly diluted lymph must be prepared every few days.

Dr. Koch's fluid, when taken by the mouth is absolutely inert. But the effect of the fluid when inhaled is very powerful, still in this latter method the dosage is so difficult to control that for purposes of general convenience and scientific accuracy it is in every way better to administer the fluid by means of the hypodermic syringe.

PART III.

THE INJECTION.

It would appear at first sight a very simple matter to inject subcutaneously with a hypodermic syringe, a fluid, and thus succeed in curing a case of Lupus; but, and this it is most important to remember, the fluid is of such an intensely active nature, so prone to undergo decomposition through careless manipulation, that assuredly, unless careful antiseptic precautions are observed, abscesses of excessively severe nature, with or without general pyæmia, or even fatal septicæmia, would result. The antiseptic precautions which it is necessary to take are the following:—First, the syringe must be carefully sterilised in the way already described; second, the place where the injection is to be made must be washed with absolute alcohol (the hands of operator after well washing should also be rinsed with absolute alcohol); and third, the cotton wool plug in the tube of diluted lymph ought only to be removed for so long a time as will allow a certain quantity to be removed by the syringe, and then quickly replaced. The tube of the needle must be cleansed before and after every operation, with the silver wire and absolute alcohol.

The injection must be made on the opposite side to that on which the patient habitually lies, below the shoulder blade, in the region of the *latissimus dorsi*; otherwise the subsequent local tenderness interferes considerably with sleep. The injections are preferably made early in the morning, 9 a.m. is the time adopted in Berlin, and would be a good hour at all times. The weakest injections must be commenced

with a solution of such strength that on injecting one cubic centimetre of liquid *in toto*, the patient shall receive 0·001 of strong original lymph. The temperature must then be observed every four hours, in order that the time when the "reaction"* sets in may be observed, and that any other results of this reaction may also not escape notice. When no further injection reaction sets in, the strength of the solution must be increased, for the reason that if a strong solution is at first made use of, the reaction is great, but a tolerance is the sooner established, and the following treatment produces little or no benefit. This does not, however, apply to lupus cases, where a lymph as strong as 0·01 may be begun with at the first trial.

In injecting, the needle must be pushed right home, and the fluid slowly forced in and allowed fully two minutes for its total expulsion and entrance flow into the tissue.

PART IV.

THE EFFECTS OF THE INJECTION.

The effect of the injection upon any case where used for the first time is to produce in the course of about three hours, according to the nature of the case, a decided rigor followed by a fairly sudden rise in the temperature, which, as exemplified in case W., rises from 36·8 (98·2) at 3 p.m. to 101·8 (38·8) at 6 p.m.; at 9 p.m. to 104—sinking again by morning to 99·2. If the case present a local lesion of tuberculous nature, this lesion swells and becomes tender, and the skin over it becomes somewhat inflamed. The patient feels drowsy, disinclined to stir, nauseated, and loses his appetite for the time being. In cases of advanced phthisis, the temperature has risen to

* The rise of temperature consequent on injection will subsequently always be spoken of as the "injection reaction," or merely "reaction." It is interesting to note, as will be seen hereafter, that this sets in, as a rule, six hours after injection.

41 = 105·8, fatal collapse has come, and the temperature sinking to 35, the patient has died. This has only taken place in cases of very advanced phthisis with cavities. The reaction is much greater in cases where tubercle exists than in non-tuberculous cases; so much so is this the case that the injection of an attenuated solution may be looked upon as a fairly trustworthy guide in the diagnosis of commencing cases of phthisis, where physical signs are incapable of detection. With very strong doses, a reaction may be obtained in the healthy non-tubercular subject.* The reaction subsides in less than 24 hours, and the patient becomes, to a great extent, tolerant of future injections of the same strength.

The temperature often becomes subnormal; and it may be stated that the higher the temperature of the reaction, the lower will it subsequently fall.

An increase in the dose by no means always produces an increased temperature, but it is advisable to begin with the lowest possible dose, otherwise the limit of dosage is soon reached, and the patient becomes tolerant. It does not however follow, that because the patient becomes tolerant and no reaction follows, that the injection ceases to produce benefit, although the physicians treating the cases at present are rather inclined to adopt this view.

The rapidity of the pulse rises considerably during the reaction, and often reaches a rate of 130–140 to the minute. Dr. Köhler, at the meeting of the Medicinische Gesellschaft, stating it had gone up as high as 160 without failure of the heart's action. Where patients have previously suffered from asthma, an attack often sets in during the reaction. Other patients who had not previously suffered from asthma were troubled with some dyspnoea during the reaction.

The injection is well borne by children at Prof. von Bergmann's clinic; one child was injected who could not have been more than five years old.

* Even this is still doubtful, as our evidence on this point was Prof. Koch's injection of himself; but lately it has been stated that he has unhappily become the subject of tubercle.

At the meeting of the Medical Society of the 20th instant were shown two cases where a well-marked exanthematous rash appeared over the front of the chest, legs, and arms, which rash lasted about two days.

In cases of phthisis, when an injection is made (preferably at about 8 a.m., for it appears that the earlier in the morning the injection be made the sooner the reaction will set in) a working in the system begins to take place within three hours, accompanied by the reaction. Then follows an increase in frequency of the cough, and more distress with the same, and a feeling of restlessness and shortness of breath; at first the patient feels undoubtedly worse, and there is occasionally some slight collapse, which, if necessary, must be treated with the free administration of stimulants; in short, the patient must be watched. The intensity of the reaction is in ratio to the stage of the disease; in the advanced cases the reaction is so great as to occasionally produce dangerous symptoms, and these cases must be treated with very dilute solutions to insure perfect safety.

When there has been a previous elevation of temperature, what is called a "disease fever,"* the reaction rise is marked, and there then follows a *fall which includes both the reaction temperature and the disease fever*.

The sputum becomes much more fluid, loses its yellow colour, and diminishes in amount, becoming at the same time much easier to expectorate. The cough becomes softer and moister. The patient begins to improve in weight. The bacilli undergo an early diminution in numbers, and also an alteration of form when seen under the microscope, many slides (which I was shown by the kindness of Dr. Runkwitz at the Laboratory of the Charité), exhibiting these changes in a marked degree.† The special change being a lessening of the size, a breaking up into débris, and a bending into a half-moon shape, some exhibiting a swelling at either end; this is not only noticed in one or two of the specimens on the slide, but the whole slide is in this

* Krankheitsfieber.

† See fig. 2 on following page.

BACILLUS TUBERCULOSIS

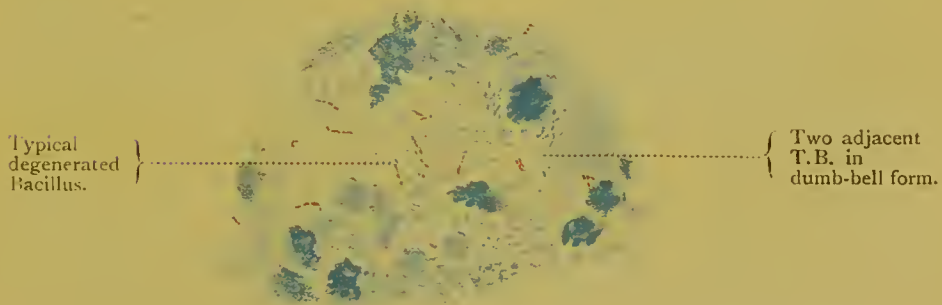
In the patient WEIGT, showing the degeneration in the bacilli after treatment with Koch's lymph.

FIG. 1.



Sputum before treatment, containing numerous bacilli.—Central part of actual field—Edges being out of focus not included—Stained by Ehrlich's method, fuchsine and methylene blue—Magnification—Reichert's 1/15-in. oil immersion lens ocular 4—Draw tube 4 cm.

FIG. 2.



Sputum after treatment, 69 days (Sept. 17—Nov. 24.) The bacilli are much degenerated, and decreased in numbers.

condition, a healthy, well-developed bacillus being difficult to find; in other words, the bacilli evidently undergo a species of degeneration. Sufficient are probably left, however, to form a fresh nidus of infection if the treatment were discontinued at this stage, and it must be assumed that it will in all cases be necessary to continue the treatment until the sputum is entirely free from bacilli. The rate of disappearance of the bacilli is approximately about as follows, according to the Gaffsky table*—1st week, innumerable; 2nd week, 9, end of second week 8; 3rd week, 7, 6, 5; 4th week, practically none. This is from a case of well-marked phthisis with intense cough, profuse expectoration crepitation and dulness over the lungs.

The influence upon the percussion note is well marked in the cases quoted at the end of the book. In some cases the dulness has been found much diminished in area. The crepitations have disappeared. This was carefully observed in cases 1 and 2; in case 1 there was dulness down to second rib. When last examined on November 21, the dulness had all but disappeared, and no crepitations could be heard, although Dr. Runkwitz noted a few.

Upon the weight the influence is most marked in case 1. This, on admission, was only $108\frac{3}{4}$ lbs., even allowing for possible error of the weighing chair, still on the 29th September 116, on the 13th November 124 lbs., on the 22nd November 125 lbs.†

The night sweats entirely disappear in most cases after the first fortnight, and this may account for the increase in weight.

The fluid is a mobile liquid of deep yellow colour of somewhat high refraction, smelling slightly of carbolic

* The Gaffsky table is for the purpose of facilitating the expression of the number of bacilli in a specimen of sputum.

† This case I weighed myself, so have no doubt as to the reality of the increase, although the amount seems large. (E. F. G.)

acid, tasting slightly saline, and is derived from cultures of the tubercle bacilli. The strength may be assumed to be saturated, which will be taken as represented by 1·0. For injection this fluid has been used in almost every strength from 0·25 upon Professor Koch himself down to ·001, which is the weakest strength used. The different strengths used in different cases will be stated as the cases are described.

The original fluid, if preserved antiseptically, does not undergo any change on keeping. Its solutions, however, do not keep even under antiseptic precaution for more than two or three weeks. The greater the dilution, the more rapid is the liability to change.

There appears to be a certain amount of anæmia produced by the reactions, a very liberal diet, including about four or five glasses of wine per diem, being advised.

At the meeting of the medical society, 21st inst., were shown certain cases of surgical wounds which had been injected. In these cases there being no tuberculosis, no reaction ensued, nor did the scars or wounds show any alteration. One case was shown of a man with a very bad burn of the right arm with a granulating surface, in the centre. An injection of ·05 solution was made, giving rise to considerable reaction, but the wound in the arm showed no alteration.

In the case of a lad shown, a most interesting fact was noticed by Dr. Köhler. The lad had a skin eruption which was presumed to be tuberculous; an injection was made, good reaction ensued, a scrofulous gland beneath the neck showed local reaction, but the skin eruption showed no change. Therefore the skin eruption was presumed to be syphilitic. In another case, one of lupus, after injection, local reaction was apparent at the seat of the lupus, but no local reaction was visible at an enlarged gland in the groin.

These cases show the value of the injection as a means of differential surgical diagnosis, for though the injection may in non-tuberculous individuals produce general symptoms,

yet it behaves with indifference to non-tuberculous wounds and enlargements. In the tuberculosis enlargements the local reaction is never absent (Köhler).

Next, with regard to patients suffering from tuberculous affections.

First, as to its effects upon Lupus. In cases injected with a 1 per cent. solution, after about three hours the general reaction becomes manifest, first a rigor, then the usual rise of temperature accompanying the reaction, certain general symptoms being also apparent; loss of appetite, furred tongue, headache, pains in the back and stomach, and diarrhœa.

Concerning Local Reaction.

In Lupus of the face the first effect is to produce within three hours a feeling of burning tightness and heat over the face and nose of the affected patient, at the same time as the commencement of the rigor the nose becomes noticeably reddened. In six hours the swelling and redness reaches its highest point, the redness and swelling are not confined to the affected part, but implicate the skin for some distance around; at about the same time an ample exudation of a yellow fluid similar to that found upon an eczematous surface takes place, which dries into crusts upon the surface. The exudation continues for about 48 hours. After two days the redness and swelling begin to subside, and after five days are only apparent upon the affected part, and even this becomes considerably paler during the following three weeks; five days after the injection the scales begin to dry up and fall off. On the ninth day they allow themselves to be taken freely off their basis. The affected part now appears quite shrunken, red, and shiny, just as those parts of a lupous patch appear which have been treated with a Volkmann's spoon. After a certain number of days the swelling of the nose subsides, and the organ regains its natural shape and outline; however, a number of small tuberculous spots remain, most

of them about the size of pin-head, forming a soft red prominence whose centre often carries a small scale. These spots, in the case under observation, increased considerably in size before the day of the second injection. The second injection was made 27 days after the first, and repeated three times at intervals of two days. After each injection redness, swelling, and exudation took place, although not to the same intensity as the first time. At the time when the patient was shown the swelling and scaling had still not completely finished. In one case exhibited, some tubercles embedded deeply in the skin had so far resisted the treatment, and Dr. Köhler gave as his opinion that this resistance was due to the thickness of the elastic tissue of this part of the skin preventing the outlet of the exudation to the surface, and thought it highly probable that absorption of the masses would take place. The only example shown in which an absolute complete cure had been established was one, a woman, in whose case Volkmann's spoon had been freely applied before injection. This rather spoilt the scientific value of the evidence it supplied.

In Disease of the Ankle and Knee Joint.—The joint after injection becomes swollen, and the skin over it tense and inflamed. The swelling and inflammation after a few days begins to subside, and the size of the joint obviously to diminish, the skin being somewhat wrinkled about the foot. In the knee cases the diminution in size was not so apparent, but there was great freedom of movement in what had previously been a stiff joint.

In one case where injection was practised for enlarged glands in the neck, three days after the injection an acute inflammation of the cornea set in with strong periorbital injection. In this case it is probable that some tubercular affection of the eye may have been present.

The question as to how the injection would affect a tubercular meningitis is not altogether devoid of interest.

In Cases of Enlarged Glands.—A swelling first takes place, with tenderness, heat, and redness, followed by perceptible diminution in the size of the gland.

In a case of enlarged tuberculous glands, after injection, swelling and pain took place at the seat of enlargement. At the same time all the enlarged glands were not equally affected; some of the glands became very enlarged and painful, others not nearly so much, if at all, affected. The value of this observation is apparent, for it shows that some glands were more infiltrated than others.

In Cases of Joint Disease shown by Professor von Bergmann: Hip Disease.—There is at first great pain and tenderness about the joint, the leg becomes flexed and fixed, where sinues are present leading into the joint, there is speedily a diminution in the amount of the discharge which also undergoes an alteration in consistency, becoming thinner and more fluid. Von Bergmann has shown four cases of hip disease in which injection was made; there are, however, other cases at the Charité Hospital. In one case Von Bergmann took a patient in for the purpose of correcting the flexion of the knee, and using passive motion. After the injection, however, the swelling of the joint gave an undoubted diagnosis of active tubercular mischief, and caused an entire retrocession of the system of treatment to be adopted.

Where fixation of the hip-joint has existed with flexion after 14 days a general improvement has taken place, with disappearance of pain and possibility of freedom of movement. Where abscess of the joint existed, cases have been treated with opening of the joint, and scraping out of the abscess without any subsequent formation of pus. The whole of the cases of hip-joint disease which have been under treatment have, without exception, improved after injection, although many were cases where absolute destruction of the joint had already taken place, and no hope of complete cure was possible. Prof. von Bergmann in particular has dealt especially with the cases of hip-joint disease, and no man can deny the extent of his success.

Tubercular Laryngitis.—One case of tubercular laryngitis has been under treatment since November 10th. Three

other cases have not been long enough under treatment to afford any useful experience.

In all cases a considerable swelling of the larynx has taken place shortly after injection.

A man suffering from supposed carcinoma of larynx was injected; in this case the larynx showed no alteration after injection, and here again the value of injection as a means of differential diagnosis was apparent. The possibility of suffocation due to swelling of the larynx must be borne in mind; at present however no case has occurred.

Phthisis.—In regard to the value of the treatment in incipient lung disease, we may at first consider its value for differential diagnosis as a means of deciding whether a certain case is one of commencing phthisis or only a bronchial catarrh. There is no doubt we have a most important and invaluable specific, one which on closer acquaintance appears to be almost infallible in its indications.* As a means of treatment, combined with therapeutic agents, we have undoubtedly an absolute means of cure. In acute phthisis its influence appears to be equally valuable, but in these cases the tendency to toleration of the specific, and the liability to recurrence of the disease will give rise to greater difficulty. In the very advanced cases with large cavities its use is most dangerous, and cases have already taken place where death has ensued from collapse in less than 48 hours of injection of the solution. It is true these cases would have succumbed to disease in a comparatively short time, and many patients in this condition would willingly run the risk of the treatment, for with greater attenuation, smaller doses, and wider precautions against collapse, a hope might still be entertained of, if not a cure, at any rate an arrest of symptoms for a time perhaps.

It is curious that the injection should in certain cases bring on asthma; possibly this fact may lead us to a better understanding of the asthmatical condition, as these two

* The diagnosis of phthisis will in future consist of: 1. Discovery of bacilli in sputum; 2. Reaction after injection with Koch's fluid.

diseases are seldom met with in conjunction. In cases of chronic bronchial catarrh, the injection will be found of no use whatever, as this is a condition in which tubercle bacillus has no share, and it is a condition which is more frequently mistaken for consumption than is perhaps generally believed. The only benefit the injection will give in these cases will be to demonstrate their non-tuberculous state.

Although a reaction is perhaps attainable in healthy subjects, it is only when a very large dose is used, such as Professor Koeh used upon himself, but the .01 injection appears to leave no influence on the healthy person.

PART V.

EXAMPLES.

Actual Cases.—All the cases to be subsequently quoted were personally seen by Mr. Grün at Berlin. Some were seen presented at the meeting of the "Berliner Medicalische Gesellschaft" at the Charité Hospital, November 21st. Others at the clinic of Professor von Bergmann, and in the wards of the Augusta Hospital. Others, by the kindness of Drs. Fräntzel and Runkwitz, in the wards of the Charité Hospital. The notes of some of these cases have already been published,* but the cases quoted here will be found to be both fuller in history and detail than the same as quoted in the *Wochenschrift*. Also by grouping all these cases, derived from varied sources, a better generalization is to be obtained, and more comprehensive view of the whole situation.

Cases of Lupus. 17 Cases.

1. Fraülein K., 34 years old, under care of Dr. Levy.
2. Fel. D., 61, Levy.
3. Theiss.

* *Medicinische Wochenschrift*, 20th November, 1890.

4. Thom.
5. Kock, 58 years.
6. Gunther, 14 years.
7. Gilver, 43 years.
8. Neumann, 22 years.
9. Neal, 22 years.
10. Schmidt, 18 years.
11. Noak, 13 years.
12. Cohn, 17 years.
13. Gottschlich, 24 years.
14. Friese, 31 years.
15. Klingbele, 24 years.
16. Wachter, 45 years.
17. Beller mann, 32 years.
18. Weigt, 26 years.

Cases of Tubercular Laryngitis.

Kegel.
Gendrich.
Nelske.
Wussow.

Cases of Pulmonary Phthisis.

- | | | |
|-----------------|---|--|
| 1. C. Tischler. | } | Advanced cases—
Fräntzel. |
| 2. S. Rangirer. | | |
| 3. B. Kellner. | | |
| 4. K. Gluser. | | |
| 1. B. | } | Cases of commencing phthisis—
Drs. Fräntzel and Runkwitz. |
| 2. W. | | |
| 3. W. | | |
| 4. W. | | |
| 5. H. | | |
| 6. D. | | |
| 7. B. | | |
| 8. E. | | |

Cases of Pulmonary Phthisis.—There have been 12 cases of pulmonary phthisis under the observation of Drs. Fräntzel and Runkwitz at the Charité Hospital,

Berlin, through the kindness of Professors Fräntzel and Runkwitz, we have been able to examine these patients and collect their histories.

There is one of the name of Weigt, who has been under treatment since the 13th of September, and he was the first case treated; his temperatures have been taken four times daily from the 13th September to the present date, and these temperatures will serve to illustrate very clearly the course and effects of the treatment.

Cases of Tubercular Joint and Bone Disease.

Anna S., under Dr. Levy, inflammation of humerus.

Boywardt, rheumatic ankle joints, with enlarged cervical glands.

Spiehalski, tubercular disease of ankle joint.

Kramer, resedum of knee.

Gertrud Freyer, tubercular hip disease.

Martha Ropler, tubercular hip disease.

Anna Wollf, tubercular hip disease.

Martha Schultz, tubercular gonitis.

Rudolf Freitag, suppurating hip disease.

Wilhelm Semerau, hip disease.

Max Reisinger, left hip disease.

Hermann Schlousky, wrist joint disease.

M. Spiegelberg, melalarsal disease.

Charlotte Voutaal, spina ventosa.

M. Froum, tubercular ankle joint disease.

Willy Ziegelsdorf, coxitis.

Tylitzki, coxitis.

Oskar Sehleusmer, coxitis.

Rudolf Weis, gonitis.

Karl Posse, coxitis.

Case 1. August Weigt. Charité Hospital, No. 10 Warde, under care of Professor Dr. Oskar Fräntzel and Surgeon Dr. Runkwitz.

Patient, age 26. Shoemaker. September 2nd, 1890. Family history good; no consumption in family. Admitted

into the Charité suffering from severe cough; night sweats. Thick yellow expectoration, four ounces in 24 hours. Sputum full of bacillus tuberculosis. On right side dullness down to second rib. Crepitations. Left lung free. Weight on admission, $108\frac{3}{4}$ lbs.

September 2nd—

Condition.	Temperature.	Treatment.	Remarks.
Weight, 108 lbs. Severe cough day and night. Night sweats. Expectoration, 4 ounces, thick yellow. Innumerable bacilli in sputum.	Morning, temperature on admission, 100'4. Evening, temperature, 101.	Creosoto inhalations. Morphia Sulph., gr. $\frac{1}{2}$, three times daily.	

Date.	Time.	C°.	F°.	Injections.
Sept. 13	11 a.m.	36'8	98'2	Solution injected 0'001 at 11 a.m. Bacilli innumerable.
	3 p.m.	36'8	98'2	
	6 p.m.	38'8	101'8	
	9 p.m.	40'0	104'0	
Sept. 14	7 a.m.	37'3	99'2	T.B. 8.*
	10 a.m.	37'5	99'5	
	1 p.m.	37'0	98'6	
	3 p.m.	37'3	99'2	
	6 p.m.	36'8	98'2	
	9 p.m.	37'8	100'0	
Sept. 15	9 a.m.	36'8	98'2	Injected fresh solution, 0'002.
	10½ a.m.	36'6	97'8	
	2 p.m.	39'0	102'2	T.B. 8.
	5 p.m.	37'1	98'8	
	3 p.m.	36'6	97'3	
Sept. 16	7 a.m.	36'4	97'5	Fresh injection.
	11 a.m.	37'0	98'6	
	2 p.m.	36'2	97'2	T.B. 8.
	8 p.m.	37'2	99'0	
Sept. 17	7 a.m.	36'0	96'8	Fresh injection. T.B. 8.
Sept. 18	No further reaction.			Fresh injection. T.B. 8.
	7 a.m.	37'1	98'8	
	10 a.m.	36'6	97'8	
	1 p.m.	37'0	98'6	
Sept. 19	4 p.m.	36'4	97'5	
	7 a.m.	—	—	
	11 a.m.	—	—	
	2 p.m.	—	—	
	8 p.m.	—	—	

* The letters T.B. with a numeral indicate tubercle bacilli in a certain quantity over the Gaffky table.

Sept. 20th. Injection of 0'002. No reaction. Sputum has become clear.

Sept. 21st. Injection of 0·002. No reaction. Clear.
 Sept 22nd. „ „ „ „
 and so on till :—

Date.	Time.	C°.	F°.	Injections.
September 25	6 a.m.	36·5	97·7	Injection of solution, 0·01. Two injections.
	9 a.m.	36·3	97·4	
	2 p.m.	37·4	99·3	T.B. 7.
	3 p.m.	37·5	99·5	
	6 p.m.	37·3	99·2	
	9 p.m.	37·0	98·6	
September 26	6 a.m.	36·7	98·0	Two injections, 0·01.
	9 a.m.	36·6	97·8	
	2 p.m.	37·2	99·0	T.B. 8.
	3 p.m.	37·7	99·8	
	6 p.m.	37·0	98·6	
	9 p.m.	37·0	98·6	
September 27	6 a.m.	36·8	98·2	Two injections.
	9 a.m.	36·8	98·2	
	12 noon	37·3	99·2	
	3 p.m.	37·4	99·3	
	6 p.m.	37·2	99·0	
	9 p.m.	37·3	99·2	
September 28	6 a.m.	36·5	97·7	No injection.
	9 a.m.	36·4	97·5	
	2 p.m.	37·1	98·3	
	3 p.m.	37·4	99·3	
	6 p.m.	37·4	99·3	
	9 p.m.	37·2	99·0	
September 29	6 a.m.	37·7	99·8	Two injections.
	9 a.m.	37·2	99·0	
	12 noon	37·3	99·2	Weight, 116½.
	3 p.m.	37·5	99·5	
	6 p.m.	37·4	99·3	
	9 p.m.	37·0	98·6	
September 30	6 a.m.	36·6	97·8	No injection.
	9 a.m.	36·8	98·2	
	12 noon	37·5	99·5	
	3 p.m.	37·8	100·0	
	6 p.m.	38·4	101·2	
	9 p.m.	38·1	100·6	
October 1	6 a.m.	36·7	98·0	Two injections, 0·01.
	9 a.m.	36·8	98·2	
	12 noon	37·4	99·3	
	3 p.m.	37·2	99·0	
	6 p.m.	37·3	99·2	
	9 p.m.	37·0	98·6	
October 2	6 a.m.	36·3	97·4	No injection. „ . . . diarrhoea.
	9 a.m.	36·4	97·5	
	12 noon	36·6	97·8	
	3 p.m.	37·0	98·6	
	6 p.m.	36·5	97·7	
	8 p.m.	37·0	98·6	
October 3	6 a.m.	36·5	97·7	Two injections.
	9 a.m.	37·0	98·6	
	2 p.m.	37·2	99·0	
	3 p.m.	37·5	99·5	
	6 p.m.	37·8	100·0	
	9 p.m.	37·6	99·7	

Date.	Time.	O°.	P°.	Injections.
October 4	6 a.m.	36°8	98°2	No injection.
	9 a.m.	36°6	97°8	
	2 p.m.	37°4	99°3	
	3 p.m.	37°7	99°8	
	6 p.m.	37°9	100°2	
	9 p.m.	33°2	100°8	
October 5	6 a.m.	37°2	99°0	Two, 0°01.
	9 a.m.	36°9	98°4	
	12 noon	37°3	99°2	
	3 p.m.	37°4	99°3	
	6 p.m.	37°6	99°7	
	9 p.m.	37°8	100°0	
October 6	6 a.m.	36°5	97°7	None.
	12 noon	37°0	98°6	
	3 p.m.	37°3	99°2	
	9 p.m.	37°7	99°8	
October 7	6 a.m.	36°8	98°2	Two, 0°01.
	9 a.m.	36°9	98°4	Weight, 116.
	12 noon	37°2	99°0	
	3 p.m.	37°4	99°3	
	6 p.m.	37°9	100°2	
	9 p.m.	37°9	100°2	
October 8	6 a.m.	36°5	97°7	No injection.
	9 a.m.	36°7	98°0	
	3 p.m.	36°9	98°4	
	9 p.m.	37°5	99°5	
October 9	6 a.m.	36°4	97°5	Two, 0°01.
	2 p.m.	36°9	98°4	
	3 p.m.	37°2	99°0	
	6 p.m.	37°4	99°3	
	9 p.m.	37°6	99°7	
October 10	6 a.m.	36°2	97°2	None.
	9 a.m.	36°4	97°5	
	12 noon	36°7	98°0	
	3 p.m.	36°9	98°4	
	6 p.m.	37°2	99°0	
	9 p.m.	37°7	99°8	
October 11	6 a.m.	36°3	97°4	Two, 0°01.
	9 a.m.	36°5	97°7	
	12 noon	36°7	98°0	
	3 p.m.	36°9	98°4	
	6 p.m.	36°9	98°4	
	9 p.m.	36°2	97°2	
October 12	6 a.m.	36°2	97°2	None.
	9 a.m.	36°4	97°5	
	12 noon	36°8	98°2	
	3 p.m.	37°3	99°2	
	6 p.m.	37°8	100°0	
	9 p.m.	37°2	99°0	
October 13	6 a.m.	37°0	98°6	Two, 0°01. Weight, 120½ lbs.
	9 a.m.	37°2	99°0	
	12 noon	37°4	99°3	
	3 p.m.	37°5	99°5	
	6 p.m.	37°7	99°8	
	9 p.m.	37°5	99°5	

Date.	Time.	C°.	F°.	Injections.
October 14	6 a.m.	37°5	99°5	None.
	9 a.m.	37°8	100°0	
	12 noon	38°4	101°2	
	3 p.m.	38°7	101°6	
	6 p.m.	38°5	101°3	
	9 p.m.	38°2	100°8	
October 15	6 a.m.	37°5	99°5	Two, 0°1.
	9 a.m.	37°2	99°0	
	12 noon	37°9	100°2	
	3 p.m.	38°2	100°8	
	6 p.m.	38°1	100°6	
	9 p.m.	38°0	100°4	
October 16	6 a.m.	37°0	98°6	No injection.
	9 a.m.	37°4	99°3	
	12 noon	38°4	101°2	
	3 p.m.	39°0	102°2	
	6 p.m.	39°0	102°2	
	9 p.m.	38°0	100°4	
October 17	9 a.m.	35°7	96°3	One, 0°1.
	12 noon	37°0	98°6	
	3 p.m.	37°8	100°0	
	6 p.m.	37°6	99°7	
	9 p.m.	37°9	100°2	
October 18	7 a.m.	36°8	98°2	No injection. Weight, 116 lbs.
	10 a.m.	36°8	98°2	
	1 p.m.	38°1	100°6	
	4 p.m.	38°0	100°4	
October 19	7 a.m.	36°9	98°4	One injection.
	10 a.m.	37°0	98°6	
	1 p.m.	37°5	99°5	
	4 p.m.	38°0	100°4	
	7 p.m.	38°5	101°3	
October 20	7 a.m.	36°7	98°4	No injection.
	10 a.m.	37°0	98°6	
	1 p.m.	37°9	100°2	
	4 p.m.	37°8	100°0	
	7 p.m.	38°0	100°4	
October 21	7 a.m.	36°7	98°0	One injection.
	10 a.m.	37°0	98°6	
	1 p.m.	37°2	99°0	
	4 p.m.	37°5	99°5	
	7 p.m.	37°8	100°0	
October 22	7 a.m.	36°6	97°8	No injection.
	10 a.m.	36°8	98°2	
	1 p.m.	37°3	99°2	
	4 p.m.	36°5	97°7	
	7 p.m.	36°7	98°0	
October 23	7 a.m.	36°4	97°5	One injection.
	10 a.m.	37°3	99°2	
	1 p.m.	37°5	99°5	
	4 p.m.	37°6	99°7	
	7 p.m.	37°8	100°0	
October 24	7 a.m.	37°1	98°8	None. Weight, 118 lbs.
	10 a.m.	37°4	99°3	
	1 p.m.	37°7	99°8	
	4 p.m.	37°8	100°0	
	7 p.m.	37°0	98°6	

Date.	Time.	C°.	F°.	Injections.
October 25	7 a.m.	36°7	98°0	One injection.
	10 a.m.	37°4	99°3	
	1 p.m.	37°6	99°7	
	4 p.m.	37°8	100°0	
	7 p.m.	38°0	100°4	
October 26	7 a.m.	36°9	98°4	No injection.
	10 a.m.	37°0	98°6	
	1 p.m.	37°5	99°5	
	4 p.m.	37°3	99°2	
	7 p.m.	37°3	99°2	
October 27	7 a.m.	36°8	98°2	One injection.
	10 a.m.	37°2	99°0	
	1 p.m.	37°5	99°5	
	4 p.m.	37°8	100°0	
	7 p.m.	38°3	101°0	
October 28	7 a.m.	37°0	98°6	No injection.
	10 a.m.	37°1	98°8	
	1 p.m.	37°3	99°2	
	4 p.m.	37°6	99°7	
	7 p.m.	37°3	99°2	
October 29	7 a.m.	37°1	98°8	One injection.
	10 a.m.	37°3	99°2	
	1 p.m.	38°3	101°0	
	4 p.m.	38°2	100°8	
	7 p.m.	38°6	101°4	
October 30	7 a.m.	37°3	99°2	No injection. Weight, 120 lbs.
	10 a.m.	37°4	99°3	
	1 p.m.	38°3	101°0	
	4 p.m.	37°0	98°6	
	7 p.m.	—	—	
October 31	7 a.m.	37°0	98°6	None.
	10 a.m.	37°1	98°8	
	1 p.m.	38°1	100°6	
	4 p.m.	37°9	100°2	
	7 p.m.	37°9	100°2	
November 1	7 a.m.	36°8	98°2	One injection.
	10 a.m.	37°5	99°5	
	1 p.m.	37°7	99°8	
	4 p.m.	37°8	100°0	
	7 p.m.	38°3	101°0	
November 2	7 a.m.	37°8	100°0	None.
	10 a.m.	36°4	97°5	
	1 p.m.	37°4	99°3	
	4 p.m.	37°5	99°5	
	7 p.m.	37°6	99°7	
November 3	7 a.m.	36°5	97°7	None.
	10 a.m.	37°2	99°0	
	1 p.m.	37°6	99°7	
	4 p.m.	37°3	99°2	
	7 p.m.	37°5	99°5	
November 4	7 a.m.	36°7	98°0	One injection.
	10 a.m.	37°0	98°6	
	1 p.m.	36°9	98°4	
	4 p.m.	37°3	99°2	
	7 p.m.	37°5	99°5	

Date.	Time.	C°.	F°.	Injections.
November 5	7 a.m.	36·7	98·0	None.
	10 a.m.	36·8	98·2	
	1 p.m.	37·0	98·6	
	4 p.m.	37·2	99·0	
	7 p.m.	37·6	99·7	
November 6	7 a.m.	36·6	97·8	None.
	10 a.m.	37·3	99·2	
	1 p.m.	37·2	99·0	
	4 p.m.	37·0	98·6	
	7 p.m.	37·4	99·3	
November 7	7 a.m.	36·5	97·7	None.
	10 a.m.	36·6	97·8	
	1 p.m.	37·2	99·8	
	4 p.m.	37·0	98·6	
	7 p.m.	37·4	99·3	
November 8	7 a.m.	37·0	98·6	One, 0·1.
	10 a.m.	37·1	98·8	
	1 p.m.	37·3	99·2	
	4 p.m.	37·2	99·0	
	7 p.m.	37·3	99·2	
November 9	7 a.m.	36·9	98·4	None.
	10 a.m.	37·0	98·6	
	1 p.m.	37·2	99·0	
	4 p.m.	37·6	99·7	
	7 p.m.	37·7	99·8	
November 10	7 a.m.	36·9	98·4	None.
	10 a.m.	37·1	98·8	
	1 p.m.	37·2	99·0	
	4 p.m.	37·0	98·6	
	7 p.m.	37·2	99·0	
November 11	7 a.m.	36·7	98·0	None.
	10 a.m.	36·9	98·4	
	1 p.m.	37·1	98·8	
	4 p.m.	37·1	98·8	
	7 p.m.	37·1	98·8	
November 12	7 a.m.	37·0	98·6	One, 0·1.
	10 a.m.	36·8	98·2	
	1 p.m.	37·2	99·0	
	4 p.m.	37·1	98·8	
	7 p.m.	37·3	99·2	
November 13	7 a.m.	37·2	99·0	None.
	10 a.m.	37·1	98·8	
	1 p.m.	37·9	100·2	
	4 p.m.	36·8	98·2	
	7 p.m.	36·9	98·4	
November 14	7 a.m.	36·6	97·8	None. Weight, 124 lbs.
	10 a.m.	36·5	97·7	
	1 p.m.	36·8	98·2	
	4 p.m.	37·2	99·0	
	7 p.m.	37·0	98·6	
November 15	7 a.m.	36·8	98·2	None.
	10 a.m.	37·0	98·6	
	1 p.m.	37·0	98·6	
	4 p.m.	37·0	98·6	
	7 p.m.	37·3	99·2	

Date.	Time.	C°.	F°.	Injections.
November 16	7 a.m.	36·8	98·2	None.
	10 a.m.	37·0	98·6	
	1 p.m.	37·3	99·2	
	4 p.m.	36·9	98·4	
	7 p.m.	37·4	99·3	
November 17	7 a.m.	36·9	98·4	None.
	10 a.m.	37·0	98·6	
	1 p.m.	37·1	98·8	
	4 p.m.	37·4	99·3	
	7 p.m.	37·0	98·6	
November 18	7 a.m.	36·8	98·2	None.
	10 a.m.	37·3	99·2	
	1 p.m.	37·3	99·2	
	4 p.m.	37·2	99·0	
	7 p.m.	37·0	98·6	
November 19	7 a.m.	36·8	98·2	None.
	10 a.m.	37·3	99·2	
	1 p.m.	37·4	99·3	
	4 p.m.	37·5	99·5	
	7 p.m.	37·5	99·5	
November 20	7 a.m.	36·9	98·4	None.
	10 a.m.	37·2	99·0	
	1 p.m.	37·5	99·5	
	4 p.m.	37·7	99·8	
	7 p.m.	—	—	
November 21	7 a.m.	36·7	98·0	Two each of 1 ce. of 0·1 sol.
	—	—	—	
	—	—	—	
	—	—	—	
	—	—	—	

* Condition on 21st November greatly improved. Sputum diminished in quantity to half an ounce in 24 hours. Dullness in percussion entirely disappeared. Crepitations absent.

Another case reported in the *Medicinische Woehenschrift* very similar in its course is also given. It is not, however, necessary to give the detailed temperatures of the other cases, as the two here reported, especially that of Weigt, will serve to show very clearly the variations in the temperatures due to the treatment.

It will be noticed under the cases that all the temperatures are given in Fahrenheit. We thought it better to translate all the Centigrade temperatures as the Fahrenheit scale is much more suggestive to the English mind (and personally I, E. F. G., prefer the Fahrenheit scale, since the actual degrees are a finer sub-division of temperature than the Centigrade scale, and the difference conveyed to the mind is greater between 102° and 104° Fahrenheit than it is between 39° and 40°, the same difference expressed by the Centigrade scale).

Pulmonary Phthisis.

CASE B.—A locksmith, aged 21 years. Family history good. In 1889, enlargement of cervical glands. Since the end of May expectoration and cough. From 30th September to 3rd October, blood in sputum.

General Condition.—Fairly nourished, tall man, with flat chest. Dulness in front on the right side down to the second rib. Behind, in the right supraspinous fossæ dulness. Numerous crepitations over the right lung. Expectoration coloured; contains tubercular bacilli up to No. 6 on the Gaffsky table. Left lung free.

Date.	Time.	Temperature.	Remarks.
October 3	7 a.m.	98·4	
	10 a.m.	99·0	
	1 p.m.	99·0	
	4 p.m.	99·7	
	7 p.m.	100·6	
October 4	7 a.m.	100·0	Injection of 0·001, 9 a.m. No blood in expectoration. T.B. 5-6. No rigor, no sickness.
	10 a.m.	98·6	
	1 p.m.	102·7	
	4 p.m.	99·3	
	7 p.m.	100·9	
October 5	7 a.m.	99·5	Injection, 0·01.
	10 a.m.	99·5	
	1 p.m.	99·1	
	4 p.m.	99·1	
	7 p.m.	101·3	
October 6	7 a.m.	99·3	Do.
	10 a.m.	99·0	
	1 p.m.	99·1	
	4 p.m.	99·7	
	7 p.m.	100·9	
October 7	7 a.m.	100·2	Slight hœmoptysis. No injection.
	10 a.m.	100·8	
	1 p.m.	100·7	
	4 p.m.	102·2	
	7 p.m.	100·4	
October 8	7 a.m.	100·8	Injection, none.
	10 a.m.	100·4	
	1 p.m.	100·4	
	4 p.m.	100·4	

Date.	Time.	Temperature.	Remarks.
October 9 -	7 a.m.	98·4	No blood in sputum. Injection 0·01, 9 a.m.
	10 a.m.	98·6	
	1 p.m.	99·3	No rigor.
	4 p.m.	103·8	
	7 p.m.	103·6	
October 10 -	7 a.m.	100·2	Patient feels very weak.
	10 a.m.	99·0	
	1 p.m.	98·6	
	4 p.m.	97·9	
	7 p.m.	97·9	
October 11 -	7 a.m.	97·7	Injection, 0·01.
	10 a.m.	98·2	
	1 p.m.	98·8	
	4 p.m.	100·9	
	7 p.m.	100·4	
October 12 -	7 a.m.	98·8	Injection, 0·02. No shivering, no rigor.
	10 a.m.	97·5	
	1 p.m.	98·0	
	4 p.m.	103·8	
	7 p.m.	104·0	
October 13 -	7 a.m.	99·3	
	10 a.m.	99·2	
	1 p.m.	97·5	
	4 p.m.	98·0	
	7 p.m.	97·7	
October 14 -	7 a.m.	97·3	Injection, 0·02.
	10 a.m.	98·8	
	4 p.m.	100·2	
	7 p.m.	100·6	
October 15 -	7 a.m.	98·0	T.B., 5.
	10 a.m.	98·4	
	1 p.m.	98·4	
	4 p.m.	99·4	
	7 p.m.	101·8	
October 16 -	7 a.m.	98·4	Injection, 0·04.
	10 a.m.	99·0	
	1 p.m.	97·7	
	4 p.m.	98·6	
	7 p.m.	99·0	
October 17 -	7 a.m.	97·9	
	10 a.m.	98·6	
	1 p.m.	98·4	
	4 p.m.	98·8	
	7 p.m.	99·5	

Date.	Time.	Temperature.	Remarks.
October 18 -	7 a.m.	98.2	T.B., 4. Expectoration in 24 hours, 30 ccm. = $\frac{1}{2}$ oz.
	10 a.m.	97.8	
	1 p.m.	98.6	
	4 p.m.	97.7	
	7 p.m.	97.7	
October 19 -	7 a.m.	97.7	Injection, 0.06. Tubercle Bacilli have dis- appeared. = T.B., 0.
	10 a.m.	97.3	
	1 p.m.	97.5	
	4 p.m.	98.4	
	7 p.m.	99.5	
October 20 -	7 a.m.	97.7	
	10 a.m.	97.7	
	1 p.m.	99.5	
	4 p.m.	99.6	
	7 p.m.	99.7	
October 21 -	7 a.m.	97.9	Injection, 0.08. T.B., 0.
	10 a.m.	97.9	
	1 p.m.	98.2	
	4 p.m.	99.0	
	7 p.m.	99.4	
October 22 -	7 a.m.	97.9	Injection, 0.09. T.B. numerous in caseous lump.
	10 a.m.	97.9	
	1 p.m.	99.0	
	4 p.m.	98.2	
	7 p.m.	98.1	
October 23 -	7 a.m.	99.5	T.B. same as yesterday.
	10 a.m.	99.1	
	1 p.m.	98.8	
	4 p.m.	98.6	
	7 p.m.	98.4	
October 24	7 a.m.	97.9	T.B. same as yesterday.
	10 a.m.	97.9	
	1 p.m.	97.9	
	4 p.m.	97.7	
	7 p.m.	98.0	
October 25 -	7 a.m.	97.2	Injection, 0.1. T.B. same.
	10 a.m.	99.0	
	1 p.m.	97.7	
	4 p.m.	97.6	
	7 p.m.	98.6	

Date.	Time.	Temperature.	Remarks.
October 26 -	7 a.m.	97·9	Injection, none.
	10 a.m.	97·9	
	1 p.m.	98·1	
	4 p.m.	98·6	
	7 p.m.	98·2	
October 27 -	7 a.m.	98·0	Injection, 0·1. T.B. same.
	10 a.m.	99·5	
	1 p.m.	97·7	
	4 p.m.	98·0	
	7 p.m.	99·0	
October 28 -	7 a.m.	97·5	Injection, none. T.B. same.
	10 a.m.	98·6	
	1 p.m.	98·0	
	4 p.m.	98·4	
	7 p.m.	97·9	
October 29 -	7 a.m.	97·3	Injection, 0·1. T.B. same.
	10 a.m.	97·7	
	1 p.m.	98·8	
	4 p.m.	98·6	
	7 p.m.	99·8	
October 30 -	7 a.m.	98·8	Injection, none. T.B. very few.
	10 a.m.	98·8	
	1 p.m.	98·6	
	4 p.m.	98·6	
	7 p.m.	99·0	
October 31 -	7 a.m.	97·4	Injection, none. T.B. disappeared. = 0 in 20 cc. Expectoration.
	10 a.m.	98·2	
	1 p.m.	98·6	
	4 p.m.	97·9	
	7 p.m.	98·4	
November 1 -	7 a.m.	97·5	Injection, 0·1 cc. T.B. very numerous.
	10 a.m.	97·9	
	1 p.m.	98·3	
	4 p.m.	98·3	
	7 p.m.	98·4	
November 2 -	7 a.m.	98·6	T.B. same.
	10 a.m.	98·6	
	1 p.m.	98·4	
	4 p.m.	98·6	
	7 p.m.	98·6	

Date.	Time.	Temperature.	Remarks.
November 3 -	7 a.m.	97·7	
	10 a.m.	97·6	
	1 p.m.	98·4	
	4 p.m.	98·6	
	7 p.m.	98·0	
November 4 -	7 a.m.	97·6	Injection, 0·1.
	10 a.m.	96·8	
	1 p.m.	97·7	
	4 p.m.	98·6	
	7 p.m.	98·6	
November 5 -	7 a.m.	99·0	No T.B.
	10 a.m.	98·2	
	1 p.m.	98·8	
	4 p.m.	99·0	
	7 p.m.	99·0	
November 6 -	7 a.m.	97·0	T.B. very scarce and very degenerated.
	10 a.m.	97·7	
	1 p.m.	98·4	
	4 p.m.	98·2	
	7 p.m.	98·0	
November 7 -	7 a.m.	97·7	T.B. disappeared. Since 24th Oct. has gained 1½ lbs. weight.
	10 a.m.	98·0	
	1 p.m.	98·2	
	4 p.m.	98·0	
	7 p.m.	98·2	
November 8 -	7 a.m.	98·0	T.B. not present. Expectoration 10 cc.
	10 a.m.	97·6	
	1 p.m.	98·2	
	4 p.m.	98·8	

At the end of 35 days' treatment the condition of this case was as follows :—

The dulness of the right side still noticeable. Crepitations very much diminished, only to be detected upon coughing. Blood was not again expectorated. Expectoration less, of glairy transparent consistency. The night sweats had disappeared. Tubercle bacilli completely disappeared. Had gained 1½ lbs.

*CASE C.—Shoemaker, 20 years, good family history. Since Christmas, cough and expectoration. Hæmoptysis of lengthy duration.

* Temperature of this case given in Addenda under name of Nilschke.

Condition.—Weak small man with unusual pallor. Right supraclavicular dulness. Left side dulness to second rib, over the dull areas numerous small fine crepitations. Profuse expectoration. Tubercle bacilli No. 6.

After 27 days' treatment there remained over both supraclavicular fossæ slight dulness. The dulness had completely disappeared over the left clavicle. On the right side crepitations entirely absent. On the left side they are still noticeable. General condition good. Cough only at night and morning. Expectoration markedly diminished, about half an ounce in the 24 hours.

Tubercle bacilli quite disappeared. A gain in weight of four pounds.

CASE D.—Joiner, 28 years, hereditary consumption.

History.—For four years coloured expectoration, debility, breathlessness. Was treated with creosote without improvement of symptoms.

Present condition.—Small fairly well-built man. Over both apices and on left side dulness to the second rib; crepitation especially on left side. Expectoration slimy, purulent, copious: contains tubercle bacilli, No. 4, Gaffsky.

After 32 days' treatment the condition was as follows:—

At left apex, crepitation; at right, crepitation only after coughing; besides this, dulness over both supraclavicular fossæ. General condition had greatly improved. The night sweats, which earlier had been very severe, completely disappeared. At first, loss of weight, afterwards gain of $\frac{3}{4}$ lb. Expectoration diminished. Tubercle bacilli at one time entirely absent.

CASE E.—Shoemaker, 42 years, hereditary consumption. In 1868, hæmoptysis, since that time no reappearance. Four weeks ago suffered with stitch in side. For eight days, cough; since three days, hæmoptysis.

Present condition.—Middle size fairly strong man. Over both supraclavicular fossæ dulness; behind at the top of the right scapula, dulness with bronchial breathing.

After 30 days' treatment presented following conditions :—

Over both supraclavicular fossæ, slight dulness.

On left side at height of inspiration a few crepitations. The dulness and bronchial breathing at back of scapula disappeared. Cough only in the morning. Expectoration reduced to a minimum. Bacilli for many days entirely absent. Blood is no longer present in sputum. General condition good; $3\frac{1}{3}$ lbs. increase in weight.

CASE F.—Plaster of Paris grinder, aged 26, healthy family history. Since Christmas, cough and expectoration. Treated with creosote.

Present condition.—Tall lean man; in front right side dulness to second rib, innumerable minute crepitating rales, which are also to be heard at the left apex, although in this place there is no noticeable dulness.

Expectoration very copious, thick, slimy, purulent; contained tubercular-bacilli No. 5.

After 15 days' treatment very few crepitations; dulness on right side diminished. General condition good. Night sweats seldom, cough only troublesome at nights and in the early morning, very little during day. Expectoration had diminished to about $\frac{1}{3}$. Tubercular-bacilli at same time quite absent; gained $4\frac{1}{2}$ lbs.

CASE G.—Shocmaker, 44 years, of healthy family history. Summer of 1889 left-sided pneumonia. Since about five weeks breathlessness. Expectoration in the morning. Shortly before admission, hæmoptysis.

Present condition.—Dulness in both supraclavicular fossæforme, left side dulness down to second rib, rales, six days after admission hæmoptysis, expectoration pretty copious; contains tubercular bacilli No. 3.

After 19 days' treatment, there is still dulness over both supraclavicular fossæ, especially left, over the left apex crepitations are still to be heard. Expectoration very scanty. Tubercular bacilli quite disappeared. Increase of weight, $1\frac{1}{4}$ lb. Patient discharged at his own request.

CASE H.—Saddler, 28 years of age, hereditary consumption. A year ago left-sided inflammation; seven weeks ago right-sided inflammation of lung, since this time slight cough, great expectoration. Shortly before admission the expectoration was tinged with blood.

Present condition.—Rather weakly man. Right front over the clavicle slight dulness, a few crepitations. Expectoration slimy, somewhat tinged with blood; contained tubercular bacilli No. 3.

After 28 days' treatment, there was still present over the clavicle on right side diminished percussion note. Crepitations absent. Cough only mornings. Expectoration very sparse; in 24 hours less than half-an-ounce.

CASE I.—Tubercular bacilli almost entirely absent. Night sweats still present, though less intense. General condition good. Gain of weight, 3 lbs.

A resumé of these cases gives a general improvement, it is true that cases of phthisis do improve when taken into a hospital and put under careful treatment, but apart from the improvement we should expect from the amelioration of environment, there is the absolute diminution in number of the bacilli, the alteration in the character and amount of the sputum, the cessation of the night sweats, the absolute clearing up of the previously existing dulness, and the disappearance of the crepitations. This alteration in the physical condition of the patients leaves no doubt as to the potency of the injection.

An interesting fact may be noticed in the temperature of the reaction. When a general view of the same is taken, for where a reaction has failed to set in within the usual period during which the reaction is effected it very often becomes manifest in a modified degree on the following or even the second day after the injection has been made, at about the same hour of the day that it should have occurred, this is noticeable on following days: 5th November in Case 1 B; 7th October, Case 1 B; these cases show the retarded reaction. In case of Weigt, 4th October,

30th September, 28th September. The rise in temperature appearing to take place in the form of waves.

So far the deaths have not been very carefully reported, but the following case will serve to show how fatal results may occur; the details were very much as follows :—The patient, an advanced case of phthisis with cavities, was taken in with a temperature of about 102° . Injection was made, the temperature went up over 106° , and was followed by a fall to 95° , when fatal collapse set in, and the patient died. Owing to an unfortunate accident no post-mortem examination was made upon this case.

The other cases of advanced phthisis were not reported in full.

Lupus.

We will now report only one case of lupus *in extenso*, the action of the injection upon surgical cases being so simple as compared with the changes in the lung cases that we do not consider it necessary to burden a small work of this character with unnecessary repetition. This case is taken from a published report by Drs. Köhler and Westphal. The case was exhibited both at the hospital and at the meeting of the Medical Society of Berlin.

Max. T—, merchant, age 28 years, who had been under treatment at the Charité for lupus of the nose, upper lip, chin, and cheeks, was first troubled six years with a tubercular and pustular eruption on the upper lip, which upon surgical treatment was apparently relieved. After six months the eruption appeared again at the same place, also upon the nose. Notwithstanding continued treatment the process continued to increase upon the nose. By its increase the whole nose, with the exception of the bridge, had undergone lupous degeneration. The alæ of the nose partly destroyed on both cheeks, and beneath the chin were lupous spots about the size of a sixpence.

On the 28th November 1889, also on the 18th April, 17th June, 9th July, and 18th August of this year, the tubercles and infiltrated spots were cauterised, and afterwards treated with balsam of Peru.

On the 10th of October 1890 the mischief was in a very active state, the infiltration encroaching upon the septum, spots were present beneath the skin and upon the left side of the mouth.

On the 12th October, 10.45 a.m., an injection of 1 c.c. of 1 per cent. solution was made in the usual place. At 1 p.m. a feeling of heat, burning, and swelling of the face, followed immediately by rigors, the nose being at the same time injected, and swollen. At 4.30 p.m. the whole face was suffused. The nose and other affected spots severely swollen, of a dark red colour, likewise the skin immediately beneath the eyes. Upon the lower half of the nose, the middle part of the upper lip, the spots on the cheeks, and under the chin then appeared a yellow exudation, which now dried to a crust. Neck and trunk covered with a scarlet exanthematous rash. Complained of headache and feebleness, loss of appetite, and furred tongue. The pulse, 120 to the minute, full, high, and fairly strong. Temperature 104° .

On 13th October the face was still red and swollen, and the scab had formed. Headache and dyspepsia less marked; tongue still furred, pulse 96, fairly good. The exanthema still present. The temperature sank to between 100° and 102° .

14th October.—The appearance of the face the same as yesterday, the exudation in greatest part dried. Temperature sank between 98° and 99.5° .

15th October.—The congestion of the face going off; the exudation everywhere dried into a solid scab. Upon the bridge of the nose and at the upper parts of the scab the skin seemed to be somewhat drawn in and lying in fine folds parallel to the bridge of the nose. Highest temperature, 99.0° .

17th October.—The congestion of the face has subsided, except upon the nose, the upper lip, and the cheeks, where it is about the same as on the day of injection. The spots on the right cheek have lost their scab, with the exception

of a small flake in the centre; in isolated spots upon the nose and upper lip the crusts have begun to break off.

18th, 19th October.—No perceptible alteration. Temperature normal, appetite and general condition good.

20th October.—Redness and swelling of the face the same. The scabs upon the upper part of the nose and the spot on the right cheek allow themselves to be easily removed. The bridge and point of nose appear smooth and light red, covered with young and tender scar tissue; on the upper part of both alæ, together with the edges, are pale granulations. The red spot upon the left cheek, except a small spot the size of a pin's head, shiny and flat.

21st October.—The scarring upon the nose has made further progress, the edges of the alæ still granulating. The scab of the upper lip separating. The upper lip in greater part shiny, and covered with fine skin.

24th October.—Lip completely covered, the nose and the spots covered with white specks.

5th November.—The nose in general of a pale red colour, and surrounded at the sides with a one centimetre wide band. The little spots upon the nose were disappearing. The general condition so far was good, and the temperature either normal or sub-normal.

7th November.—1 p.m., injection of 1 c.c. 1 per cent. solution in usual place; at 4.30 goose-skin over the whole body; pretty severe rigor, the nose redder than before the injection; tongue not furred; headache; pulse 120, high, fairly strong tension; at 5.30 complains of incontinence and a feeling of increased tightness in face, which is flushed. Swelling and congestion of the nose and remaining lupous spots. At same time red exanthematous eruption upon the trunk. The shivering lasted half an hour, and was followed by a hot stage. Temperature at 8.30, 104.4.

8th November.—Nose, upper lip, the spots upon the lips, cheeks, and under the chin still fairly flushed and swollen. The swelling not so great as after the first injection, upon nose and upper lip again the yellow exudation, which covered the whole of the red surface, not nearly so copious or so viscous. Upon the flakeless part of the

lipous nose small white pustules; nasal aperture not closed. The healthy nose root very slightly injected and free from scurf. During the night the temperature subsided to $101\cdot2$. The highest temperature to-day, $102\cdot0$. Pulse 96. Headache, depression, &c. Eruption subsiding.

9th November.—Face as yesterday. Urine brown red. Urine with yellow foam, free from albumen. The nose and face still decidedly redder than before the second injection, but still paler than yesterday. Scales upon the upper lip and nasal apertures. The spot on the right cheek, the one beneath the chin, and the one on the right cheek covered with white heaped-up branny scales.

10th November.—Morning temperature, $97\cdot7$; 9.45 injection of 1 c.c. 1 per cent. solution. Rigour at 12; duration one hour. The temperature reached 104 at 4 p.m., and fell by the next morning to $97\cdot4$. At 5 p.m. there is no alteration in appearance of the face. On breast and back a macular eruption. No headache. Pulse 120, high and full.

11th November.—Local condition as yesterday, perhaps the redness of face is less than yesterday; the scales still adhere. Upon the remaining red parts white flecks. Rash disappeared. To-day the temperature did not reach $98\cdot8$.

12th November.—Nose and face paler than yesterday. 9.45, injection of 1 c.c. 1 per cent. solution. At 12.15 slight rigour lasting one hour, after which, feeling of heat. At 2 o'clock a feeling of swelling in face complained of. No alteration in appearance of face at 5.30. The nose, with exception of its base, for a breadth of 3 centimeters strongly swollen, redder and denser than yesterday morning. Urine dark red brown, free from albumen, Gmelin's test evolved nothing. Temperature at 3 p.m. reached 103 , and fell by next morning to $97\cdot2$, and has remained sub-normal since.

Urine, dark red brown, free from albumen. The nose and surroundings paler than yesterday, and less swollen. The scales remain firm.

14th November.—The redness and swelling have subsided still more, but were still undoubtedly more marked

than was the case previous to the second injection. A strong discharge of pus was taking place from the lupous parts. In order to protect the young tender skin from infection by the pus, a compress of permanganate of potash was applied and the nose smeared with boracic vaseline. The patient until now had received 4 c.cm. of the 1 per cent. solution, that would be 0·04 c.cm. of the undiluted preparation.

The above quoted case gives a very good representation of the course of the treatment, and is a very typical case. There have now been some hundred or perhaps more cases of lupus treated, in all which the course pursued has been practically the same.

Cases of Tubercular Laryngitis.

Four cases, under Prof. von Bergmann:—

(1.) *Kegel*, 28 years old, suffered $1\frac{1}{2}$ years from feverishness and cough, probably old case of fibroid phthisis; dulness on both sides of the back down to angles of scapulæ; in front in right side to second rib; left down to clavicle; interarytenoid ulceration and infiltration over the arytenoid cartilages.

Injection of 0·01 lymph—

T. before injection	-	-	-	97°·8
T. 1 hour after, <i>i.e.</i> , at 1 o'clock	-	-	-	99°·2
T. " " 5 " -	-	-	-	101°·0
T. " " 7 " -	-	-	-	102°·6
T. " " 9 " -	-	-	-	103°·5

At 9 o'clock the neighbourhood of the ulceration was intensely swollen and inflamed, as in acute inflammation.

(2.) *Gendrich*, 42 years; three years consumptive; feverish for three weeks; advanced consumption in both lungs; ulceration and erosion of left vocal chord.

Injection of 0·005 lymph.

T. before injection	-	-	-	98° F.
T. after " at 1 o'clock	-	-	-	99°·5 F.
T. " " at 5 "	-	-	-	99°·7 F.
T. " " at 7 "	-	-	-	99°·8 F.
T. " " at 9 "	-	-	-	102°·0 F.

Intense congestion in neighbourhood of ulcer; left vocal chord much swollen.

(3.) *Nelske*, 27 years; three years consumptive. Both apices infiltrated, reaching at back as low as spine of scapula, in front down to clavicle. Diffused sub-mucous laryngitis. Epiglottis, and ary-epiglottic folds strongly infiltrated. Ulceration of both vocal cords.

Injection of 0·005 lymph.

T. before injection	-	-	-	98°·6 F.
T. after	„	at 1 o'clock	-	99°·5 F.
T. „	„	at 3 „	-	100°·4 F.
T. „	„	at 5 „	-	104°·0 F.
T. „	„	at 7 „	-	105°·6 F.
T. „	„	at 9 „	-	103°·8 F.

Epiglottis rather more swollen; laryngeal mucous membrane, pale throughout and unaltered.

(4.) This case had been already for some little time under treatment.

Wussow, 31 years, nearly two years consumptive. Hardly appreciable apical affliction. Slight ulceration, and polypoid growth in the anterior angle of the glottis, and on the borders of the epiglottis.

Injection of 0·2 cc. 1 per cent. solution = 0·002 on Nov. 10th, 1890—

T. before injection	-	-	-	98°·0 F.
T. highest arrived after injection	-	-	-	104°·2 F.

Nov. 11th—

Slow subsidence of temperature.

Nov. 12th—

Injection 0·02 lymph.

T. rose to	-	-	-	100°·8 F.
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Nov. 13th—

Normal temperature. Patient during the night expectorated a slough derived from the larynx. Microscopic examination revealed the giant cells found in tuberculosis.

Nov. 14th.—

Injection of 0·03 lymph.

Evening temperature - - 101°·2 F.

Nov. 15th—

Temperature normal.

Nov. 16th—

Injection of 0·04 lymph.

Evening temperature - - 101°·6 F.

A case of carcinoma of the larynx was injected with 0·01 lymph, therefore, more than twice as strong a solution as the patients Gendrich and Nelske were subjected to. No fever; generally health undisturbed. Temperature did not rise above 97°·8 F. (*Note.*—It appears that the average normal temperature in Germany is somewhat lower than in England. E. F. Grün.)

This last shows the value of the injection as a means of differential diagnosis, say, between tuberculous disease of larynx, on one hand, and syphilitic or cancerous on the other.

It would be impossible to describe all the foregoing 21 cases, which are at present under treatment within the compass of this small work. Therefore, we select a few of the most typical, as follows:—

No. 1.—Anna T., 23 years, under treatment of Dr. William Levy. Has suffered since her fourteenth year with bone abscesses (ostitis). After one of these abscesses in the neighbourhood of the shoulder joint, for a long time there remained a fistula, from the margin of which lupus developed, and in the course of three years this latter spread over the whole of the left arm, over the front and back of the neck, and over the greater portion of both cheeks, a really terrible case. On reception of the patient at the hospital the left arm was intensely swollen, the skin in the bend of the elbow was alone unaltered; the rest showed by its suppurative scars evidence of severe pre-existent lupus. There was no elevation of temperature. On October 8th, at 10 o'clock, 1 per cent. of the solution

was injected. After a few hours, preceded by a rigor, an elevation of temperature occurred, which at 3 o'clock had reached $105^{\circ} \cdot 2$ F., the patient being insensible and delirious. Coincident with the rise of temperature the arm and afflicted portion of the skin became intensely swollen, till the left arm had reached a considerable circumference, the hand being œdematous. The scars were little altered, but where even the smallest lupus tubercles were visible these were surrounded by a broad, dark red zone, and through these dark red spots it was easily possible to discover where tuberculous matter still existed. Still more changed were the tubercles on the forearm and the back of the hand, they were intensely swollen and of a dark blue colour. An incision into these latter showed that the lupus growth extended through the entire thickness of the skin, and had an appearance of dried blood clots. The arm was suspended in a Volkmann's splint. The eruptions on the arm, hand, and face quickly dried up, and were soon covered with the "Brandschorfen" * appearance, as if they had been cauterised. The slough came away after eight days. The patient remained from now on feverless, and it was hoped that healing would ensue from this one injection.

On the 27th October, at 10 a.m., another injection was made. The consequences were not so intense, but still very severe. The temperature again rose to 104° F., with delirium, the lupus tissue swelled up, and the scars in the places also became swollen and congested; this time, however, no necrosis took place. On the 5th and 6th of November injections were again made; the temperature rose to $105^{\circ} \cdot 8$ F.; next time it rose to $105^{\circ} \cdot 0$ F., but the swelling was much less. The injections will be repeated at short intervals, *i.e.*, every other day, and as soon as the patient no longer reacts to 0·1 lymph, the strength will be gradually increased to 1·0 or the saturated. At the time of writing the patient remains in about the same condition as after injection No. 2.

* Slough produced by actual cautery.

No. 2.—Willy Siegeldorf, 3 years old; left-sided hip disease existent already some weeks; slight abduction and flexion.

I. Injected lymph 0·001, 6th November.

T. before injection - - - 98°·8 F.

T. highest after injection - - 104°·0 F.

T. became normal, 7th November.

II. Injected lymph 0·001, 8th November.

T. highest after injection - - 100°·8 F.

T. became normal, 9th November.

III. Injected lymph 0·001, 10th November.

T. highest after injection - - 103°·6 F.

T. became normal, 11th November.

IV. Injection same, 12th.

T. highest - - - 102°·4 F.

T. normal on 13th.

V. Injection same, on 14th.

T. highest - - - 101°·2 F.

T. normal on 15th and 16th.

Notes :—General improvement. At present time only slight impairment of movement. Leg can be completely straightened.

No. 3.—*Tylitzki*, 2½ years old. Right hip disease, eight weeks. Severe adduction, flexion, and swelling. Five injections were made as in foregoing case, the temperature each time returning to normal, and the highest temperature being 105°·2 F.

Notes :—General reduction of swelling and pain; both remain in modified amount. Condition of limb unaltered. Probably separation of Epiphysis.

No. 4.—*Oscar Schleusmer*, 6 years old, 1½ years right hip disease. Intense flexion; adduction; luxation; large

abscess under gluteal muscle; five injections of 0·002 lymph usual effects. Highest temperature, 102°·6.

Notes :—Very slight improvement. (Not more than might be accounted for by the rest in bed.—E. F. G.)

No. 5.—Tubercular gonitis with abscess, one year's duration, age 23. Four injections; severe reaction; temperature rising to over 105° after each injection.

Notes :—Knee showed after each injection an increase of pain and swelling, which quickly disappeared and left slight improvement. The knee is now much less swollen than at the commencement of the treatment, but still painful, and the abscess remains.

Case of Ankle Joint Disease under Drs. Köhler and Westphal.

The 18 year old Leonadia Spichalski has presented herself at this department since the 28th May 1890, concerning an inflammation of the right ankle joint, which commenced without obvious reason about December of the previous year, and which had continued with occasional remissions. The joint on admission was considerably swollen, so that the malleoli were not so prominent as in the other foot. Passive movement was intensely painful. The only treatment adopted was to enclose the foot in plaster of Paris.

On the 11th October around the malleoli and over the ankle joint the foot was extensively swollen. The swelling was most marked on the inner side of the tendo achillis. The skin of normal colour and not œdematous below the inner malleoli. Fluctuation and bluish discolouration of the skin which had earlier been more or less existent. Active movement of the foot greatly restricted. The attempt to perform passive movement produced great pain. Circumference of the foot across the ankle and around the heel 10·8 inches. Diagnosis. Tubercular ankle joint disease.

CASE.—*Leonadia Spichalski.*

Date.	Time.	Temperature.	Remarks.
Oct. 11	10 30	98°6	Injection 1 cc., 1 per cent. solution. Foot inflamed and tender.
	and 11 a.m.		
	2 p.m.	99°3	Circumference of foot 7.0 p.m. 10·92 inches.
	4 p.m.	102°0	
	7 p.m.	103°8	
Oct. 12	7 a.m.	100°4	Injection of 0·2 cc. m. Swelling of foot.
	10 a.m.	99°5	
	1 p.m.	99°5	
	4 p.m.	101°4	
	7 p.m.	102°0	
Oct. 13	7 a.m.	99°5	Injection of 0·2 cc. m.
	10 a.m.	100°2	
	1 p.m.	99°2	
	4 p.m.	99°7	
	7 p.m.	99°0	
Oct. 14	7 a.m.	99°0	Injection of 0·3 cc. m.
	10 a.m.	98°8	
	1 p.m.	98°6	
	4 p.m.	100°4	
	7 p.m.	104°4	
Oct. 15	7 a.m.	97°0	
	10 a.m.	96°8	
	1 p.m.	98°4	
	4 p.m.	97°5	
	7 p.m.	97°2	
Oct. 16	7 a.m.	98°6	Injection of 0·3 cc. m.
	10 a.m.	98°0	
	1 p.m.	97°6	
	4 p.m.	101°3	
	7 p.m.	104°2	
Oct. 17	7 a.m.	98°6	
	10 a.m.	97°9	
	1 p.m.	97°7	
	4 p.m.	97°4	
	7 p.m.	—	
Oct. 18	7 a.m.	97°4	Injection of 0·04 cc.
	10 a.m.	98°8	
	1 p.m.	99°0	
	4 p.m.	104°0	
	7 p.m.	103°8	
Oct. 19	}	Temperature	
Oct. 20		remained at 97°7	

Date.	Time.	Temperature.	Remarks.
Oct. 21	7 a.m.	97°·5	Injection of 0·05 cc.
	10 a.m.	97·2	
	4 p.m.	103·8	
	8 p.m.	104·4	
Oct. 22	7 a.m.	98·6	
	10 a.m.	97·2	
	1 p.m.	98·4	
	4 p.m.	98·6	
	7 p.m.	98·4	
Oct. 23	7 a.m.	98·0	Injection of 0·5 cc.
	10 a.m.	99·3	
	1 p.m.	98·6	
	4 p.m.	101·3	
	7 p.m.	102·0	
Oct. 24	7 a.m.	97·5	
	10 a.m.	97·6	
	1 p.m.	97·8	
	4 p.m.	97·8	
	7 p.m.	98·0	
Oct. 25	7 a.m.	97·2	Injection 0·5 cc.
	10 a.m.	97·2	
	1 p.m.	97·7	
	4 p.m.	99·8	
	7 p.m.	100·2	
Oct. 26	7 a.m.	97·2	
	10 a.m.	96·8	
	1 p.m.	98·6	
	4 p.m.	98·6	
	7 p.m.	98·4	
Oct. 27	7 a.m.	98·2	Injection 0·6 cc. 8th Nov. 0·1. 11th Nov. 0·2. 13th Nov. 1·0.
	10 a.m.	98·4	
	1 p.m.	98·6	
	4 p.m.	99·0	
	7 p.m.	99·5	
Oct. 28	7 a.m.	98·6	
	10 a.m.	100·4	
	1 p.m.	101·2	
	4 p.m.	100·6	
	7 p.m.	100·4	
Nov. 13	—	—	After this time, temperature sub-normal and imperfectly recorded. Injection 1·0 cc.
	7 a.m.	97·7	
	10 a.m.	96·9	
	1 p.m.	99·5	
	4 p.m.	102·0	

This case, which shows the variations of temperature very well, and also underwent considerable local reaction, did not, however, as long as the observation has so far been possible, show any very great improvement, although certainly the total swelling of the foot was slightly diminished, but the fluctuation and pain were still present, also the fixation of the joint was unaltered, so that this case cannot be considered an example of curative treatment.

Tubercular Gland Cases.

10th November.—10.20, injection of 1 cc. of 1 per cent. solution. Temperature before injection, 98·2. Temperature, 9 p.m., 105.

12th November.—10.35, injection of 1 cc. of 1 per cent. solution. Temperature before injection, 99. Temperature, 9 p.m., 103·8. Next morning temperature normal.

14th November.—10.20, injection of 1 cc. of 1 per cent. solution. Temperature, 99·2. 3 p.m., 101·8. 9 p.m.; 97·8.

After the first injection the glands became very painful, and one gland was slightly, though distinctly, enlarged. Afterwards the swelling subsided. At present date, November 20th, the glands are all distinctly smaller than at the commencement of the treatment.

The first injection produced a bright red papular exanthema of the neck, shoulders, upper part of chest, and back, which reappeared after each injection.

Tubercular Gland enlargement.

Three cases given :—

1. Anna Genkow, 13 years old.
2. Frieda Sander, 7 years.
3. Anna Harmuth, 21 years.

CASE 1.—Has suffered three years with enlarged cervical glands, which very gradually swelled to the size of a walnut, and now form a mass as large as the fist, in the

sub-maxillary, and lateral cervical region. Temperature before injection, $99^{\circ}\cdot2$; after injection, evening temperature $104^{\circ}\cdot4$. The glands were greatly enlarged. Still under observation.

CASE 2.—Frieda Sander, undoubted scrofulous diathesis, blepharitis (an eczema of the margin of the lids), photophobia, scrofulous rhinitis, and eczema narium, lymphadenitis of cervical glands. Nothing perceptible in lungs. Injection of $\cdot2$ c.cm. of 1 per cent. solution.

CASE 3.—Anna Harnuth, 21 years, anæmic tailoress, for two years swollen glands over the collar bone, a number of swollen cervical glands at the hinder margin of the sterno mastoid and angle of the jaw on both sides, the largest gland was of the size of a hen's egg.

6th November.—10.30 a.m., injection of 1 per cent. solution. Temperature $98^{\circ}\cdot8$; evening, $104^{\circ}\cdot4$.

7th November.—Temperature normal.

8th November.—1.20 p.m., injection of 1 c.c. 1 per cent. solution. Temperature before injection, $98^{\circ}\cdot8$. After injection, $104^{\circ}\cdot6$. Next morning, $99^{\circ}\cdot5$.

Anna Gutschmidt.—Twenty-one years. (This case was exhibited at the medical society by Dr. Köhler.) Patient presented herself on the 24th September, 1890, with a lymphatic swelling under right lower jaw. Glands were extirpated on the 27th September. Wound healed in 14 days. She had on the neck marks of former lymphatic abscesses. Her condition on the day of first injection was as follows:—Left side of neck, several very large scars, extending from beneath right ear forwards. On October 23rd, 1 cc. of 1 per cent. solution was injected, 9 a.m.; at 4 p.m. rigor took place, and immediately afterwards headache, backache, and pains in the joints. By evening, scars, with exception of the last one formed, were inflamed and swollen. On the back there was a red papular rash; temperature rose to 103° . The congestion of the cicatrices subsided during the course of following day. On the 29th they had assumed their original condition. Before,

on the 26th, a severe pericorneal inflammation of the right eye took place, and on the 27th a small central opacity of the cornea was observed, and a small ulcer in the inner and lower divisions of the cornea. Under treatment with atrapin the condition improved until the 10th of November, when, after the eighth injection, a sudden and complete colouration of the conjunctiva took place. This injection of the 8th of November which was made at 4.30 p.m. was followed late in the evening by a rigor, and an elevation of temperature, which reached its maximum, 102° , on the following morning at 10 o'clock, and gradually fell, till, on November 11th, it was subnormal. On the 9th November the scars, with the exception of those under the right lower jaw, were greatly swollen, red, and painful. On the 12th November the swelling had subsided. On the 13th, at 10.45 a.m., another injection 1 cc. 1 per cent. solution was made; at 1.45 p.m. a rigor; second rigor at 2.15 p.m., and intense stomachache; at 5.15 p.m. the tongue became coated with a thick grey fur; loss of appetite, pains in back and joints ensued; pulse 144, soft and small. Scars on neck very much swollen and inflamed, except those under right lower jaw; pains in the larynx, incessant cough, with foamy, slimy expectoration, inflammation and swelling in the tonsils, and the pharynx. Temperature at 7 p.m. 104° . Subsided by next morning. On the 14th November the above symptoms continued, but not so intense. The corneal ulcerations remained about the same.

PART VI.

RESUMÉ AND REMARKS.

With regard to the histories of the cases, notwithstanding the credit due to the German physicians in the carrying out of Koch's treatment, their histories of the cases leave

much to be desired from the standpoint of an English clinical clerk, especially in the physical signs recorded, which are unfortunately very sparse in the Charité records. Again, the unfortunate fact that no temperatures are taken during the night, deprives the cases of almost half their clinical interest, possibly, conceding the enormous number of patients in the Charité, it would be impossible to take all their temperatures, still the temperatures of selected cases should certainly have been observed continuously for the 24 hours.* These considerations lead us to believe that, great as is the honour due to our honourable and friendly rivals, yet we think that if the profession will only awake to the vast importance of the discovery, and the hospitals of London and the universities afford proper facilities for instruction in bacteriology, we yet hope to hold our own in medicine! At present the profession suffers from the restraint of a foolish Act of Parliament passed during the progress of a wave of sentimentalism, which is a laughing stock to the rest of scientific Europe, and which must, as long as it remains in force, hang like a millstone around the neck of the experimental physician. It is by no process of slow development and technical training that men can be educated into the rank of genius. The instinct of research is often present in the man widest removed from technical training schools. If he is fettered in the carrying out of experiments, the idea of which, but momentarily presented to his mind, if not acted upon, does not again recur, and is lost for ever. How can such a man wait to carry out his researches at a licensed laboratory with all its red tapeism and obstacles to deter and mortify?

With regard to comparisons between Koch and Jenner. All honour to both, but the difference in their discoveries lies in the fact that with Jenner the discovery was purely accidental. With Koch, on the contrary, the discovery has been synthetical, arrived at by the laborious

* I attempted to get the night temperatures, but found it was impossible.—E. F. G.

putting together of isolated facts, the carrying out of prolonged and tedious experiments, in most cases extending over months and in many cases years. The fruit of Koch's discovery, I think, all will allow to be greater than that of Jenner's, for whereas in the former all must allow its value, with regard to the latter, there are, unhappily, still a few anti-vaccinationists in this country.

One would imagine that there might, on microscopical examination of the sputa, or other diseased products of patients who had been considerably benefitted by the treatment, be observed a change in the appearance of the bacilli themselves owing to the action of lymph, and this is indeed the case; the bacilli are observed under the above circumstances to be thinner, broken up, bent, scattered, and otherwise degenerated. It might not be out of place here to say a few words about the examination of microscopical preparations of the bacillus. In cover glass preparations of ordinary tubercular sputum, a lens such as a Zeiss' D or DD, or a good English one-sixth is powerful enough, as a rule, if the examination be carefully made; but for sections and for the examination of pus, or sputum, containing these *degenerated* bacilli, an oil immersion lens is absolutely essential. Abbe's condenser should always be used in the examination of stained bacteria, with open diaphragm. For the convenience of persons desiring to purchase microscopes in consequence of reading this treatise, we would direct them to Baker, 244, High Holborn, who not only makes bacteriological microscopes, but sells those of Zeiss, Lietz, and a very good and cheap one-fifteenth oil immersion lens of Reichert, at the catalogue prices of these makers. All apparatus necessary for bacteriological work may be purchased from T. E. Becker and Co., of Hatton Wall, which firm also supplies Reichert's microscopes. The latest form of Koch's syringe, which is very neat and easy to sterilise, and also cheap, is supplied in a case at 5s. by Engmann, Charité Strasse, Berlin, who also supplies other apparatus of the lighter kinds for microscopical purposes.

In conclusion, we beg to apologise for any imperfections which appear in this publication. It was compiled and printed with the utmost rapidity from our notes which we brought with us from Berlin on the 24th ultimo.



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